

Notes on Eastern Thibet

1855

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Table referred to by Mr. Taylor.

Experiments made in smelting the iron ores of Sheargur, with Charcoal and Coke, in the cold season of 1837, or 38.

Ore.	Charcoal.	Coke.	Iron.	Per Cent.
29 Maunds....	36 Maunds.	.....	8 mds. 20srs.	42 pr. ct.
29 " "	32 " " .....	.....	10 " 20 "	86½ " "
26 " "	25 " " .....	.....	8 " 20 "	32½ " "
19 mds. 20srs.	.....	18 mds. 20srs.	3 " 25 "	18½ " "
28 maunds. ....	.....	17 " 20 "	7 " 8 "	25½ " "
27 maunds. ....	.....	14 " 0 "	9 " 23 "	35½ " "

In some of these experiments, a mixture of red gravel ore, highly obedient to the magnet was used, and likewise Kunkur or Nodular lime-stone, but I have not preserved any memorandum of the proportion of either, or in which experiment they were used.

Notes on Eastern Thibet.—By Dr. A. CAMPBELL, Superintendent of Darjeeling, (with Sketch Map of Route to Lassa).

This opportunity is taken of publishing a sketch map protracted some time ago by Major Crommelin, it will enable the reader to understand readily the position of the principal places mentioned in Dr. Campbell's Notes.—ED.

Having lived many years in the Eastern portion of the Himalaya, viz. in Nepal and Sikim, and visited the Bootan Dooars or Lowlands annually for eight years, I have had many opportunities of becoming acquainted with the natives of Thibet, who visit these countries and the plains of India to trade, and on religious pilgrimages—I have also travelled over the whole of Sikim, and penetrated a short way into Thibet in that direction.* It is from these people, and on those excursions that the substance of the following Notes has been collected by a good deal of laborious questioning, and in the course of official business. I am familiar with the writings of P. L. de Lamoignon, and others on Thibet, I have not used them, however, in these Notes, nor do I wish to substitute my own account for any portion of these published accounts. My only object is to add a little to the scanty knowledge we now have of Eastern Thibet; and I shall be glad if I have no other purpose.

* With Dr. Hooker in 1849.



Thibet is reckoned by Gutzlaff in his 'Life of the Emperor Taou Kwang,' page 227, to comprise an area of 30,200 square miles; and to have a population of about six millions. Thibet, as thus indicated in the enumeration of the dependencies of China, embraces, I believe, Little Thibet or Balti, the capital of which is Iskardo; Western Thibet the principal town in which is Leh, and Thibet Proper or Eastern Thibet, having Lassa as its capital and chief city.

The latest and best account of the Trans-Himalayan regions, is 'Dr. Thomas Thomson's Travels,' published last year in London.

Following Humboldt, Dr. Thomson divides Thibet into two grand divisions; the western one, of which he treats so ably himself, and the eastern one, to which alone my Notes refer. Western Thibet—according to Dr. Thomson "is a highly mountainous country, lying on both sides of the Indus, with its longer axis directed like that river, from south-east to north-west. It is bounded on the North-east by the great chain of mountains, to which Humboldt, following Chinese geographers, has given the name of Kounlun, by which it is separated from the basin of Yarkund. On the south-east, its boundary is formed by the ridge which separates the waters of the Indus from those of the Sanpu." "To the north-west and south-east," continues Dr. Thomson, "its boundaries are somewhat arbitrary, unless the political division of the country be had recourse to, which, depending on accidental circumstances, entirely unconnected with physical geography or natural productions, is so liable to change that its adoption would be extremely inconvenient. The best mode of drawing a line of separation between India and Thibet, in those parts where mountain chains are not available for the purpose, appears to consist in regarding the latter to commence only at the point, where the aridity of the climate is too great to support forest trees, or any coniferous tree, except juniper."

"As limited by these boundaries, Western Thibet includes the whole valley of the Indus, and its tributaries down to about 6,000 feet above the level of the sea, a considerable portion of the upper course of the Sutlej down to between 9,000 and 10,000 feet, and small portions of the upper course of the Chenab, of the Ganges (Jahnvi) and of the Gogra."

The above is a very elaborate definition of boundaries, founded

mainly, as regards the limits of India and Thibet, on the geographical distribution of plants. By it the Himalaya, so well known to Dr. Thomson, is annihilated as a mountain chain. The Kounlun however, which no body knows anything of, and which may be quite as frequently cut through by meridional rivers as the Himalaya, is admitted to that distinction.

I shall now endeavour to describe the second grand division or "Eastern Thibet." It is by all accounts an exceedingly mountainous country, i. e. it contains immense masses and ranges of the most rugged mountains in the world interspersed with extensive plateaus and deep level-bottomed valleys along the streams and rivers.

The Thibetans I have met with, do not recognize a continuous chain of mountains running parallel to the Himalaya; nor are they acquainted with "Kounlun" as the name of any mountain range. They are familiar with the Himalaya on one hand and call it "Kangri" which simply means *Snowy region*, and they know that the country of the Mongols, or Mongolia lies parallel to it on the other hand. The third great distinguishing feature in the physical geography of Eastern Thibet is the Yaroo river or Sanpoo of our maps. Thus characterised, I shall say that in popular estimation—which is not founded on the physical features of the country, on its natural productions, or on political divisions of territory, separately or jointly—Eastern Thibet is bounded on the north-west by the Kangtisee range of mountains,* and a greatly elevated tract of country extending from the base of this range; on the north by Mongolia; on the east by the Sifan and Sechuen provinces of China, and on the south by the Himalaya, from the point at which it is pierced by the Burampootur on the east, to the meridian of the Mansarowur and Rawan Rud Lakes on the west. The general direction of the Kangtisee range is north and south, and it is said to connect the Himalaya and Mongolia, as by a cross-bar. It runs to the east of the Mansarowur and Rawan Rud Lakes, its highest point is said to exceed in elevation any portion of the Himalaya, and four large rivers have their sources in different parts of the range, viz. the Singh Khawab or Indus, the Langchoo Khawab which

* The highest portion of the "Kangtisee" range is I believe the "Kylas" of Strachey.

runs through Ladak, the Marchac̃ Khawab which is known as the Gogra, and the Tamchoo Khawab or Yaroo, the great river of Eastern Thibet.

Government of Thibet.

In the city of Lassa,* and over the whole of Thibet "Geawa Remboochi" or the "Grand Lama" is nominally the Supreme authority, in temporal and spiritual affairs. His residence is in Patala Goompa which is on the north side of Lassa.

There are two Resident Envoys from China called "Ampas" stationed at Lassa; subordinate to them are two great officers—Chinese—designated Daloo-he: their rank and occupation are those of general officers. Next to these are two Phopuns who act as Paymasters of the Troops, and perform the duties of our Adjutant and Quarter Master Generals. They are also Chinese. One of the Daloo-hes, and one of the Phopuns are generally stationed at Digarchi. These officers constitute the general staff of the army in Thibet. Next in rank are three Chong-hars. They are Chinese, and Military Commanders; one is generally stationed at Digarchi and another at Tingri near the Nepal Frontier of Thibet. Below these are three Tingpuns, non-commissioned officers—also Chinese. There are no other Chinese military officers in Thibet. The usual number of Chinese Troops, all Mantchoo Tartars, in Thibet does not exceed 4,000 men. Stationed at Lassa 2,000, Digarchi 1,000, Giangtchi 500, Tingri 500.

The above shews that the Chinese functionaries in Thibet are Political and Military officers only.

All the Civil appointments are held by Thibetans. The local temporal Government of Thibet is composed as follows. It is headed by the Grand Lama entirely guided in all Political and Military affairs and mainly so in Civil affairs by the Chinese Ampas and the Emperor of China.

* M. Huo says, that "Lassa" in the Thibetan language means, "Land of Spirits." The Mongolians on the same authority call this city "Monche-dhot," i. e. Eternal Sanctuary. My friend Cheboo Lama gives the following interpretation, "L'ha" means God, "Sa" abode or resting-place. Hence it is the city of God, or the Eternal city.

The first officer is the Chemeling, the second Kandooling, the third Tengeling; they are all Thibetans and the Chief Lamas—Awataris—of Goompas* bearing those names. From these three Lama Counsellors, the emperor of China nominates the Noume-hen,† “Nome Khan” of M. Huc, who may be called President of the Council, or Prime minister. He is Regent when the Grand Lama is a minor, and at all other times is the alter et idem of his holiness. The Noume-hen is always one of the three Great Lamas above named. At his death, or removal from office, he is succeeded in the Noume-hen’s office by one of the two remaining counsellors, always however under orders of the emperor. His successor as head of his Goompa must, as in the case of a “Grand Lama” be an awatar, i. e. he must re-appear in the flesh as a child, and be raised to that position.

Of equal rank with the Noume-hen, but having no temporal authority, is the Genden Tapa Lama, he is next to the Grand Lama himself the highest clerical authority. He is finally appointed by the emperor, being in the first instance chosen on account of his superior attainments and sanctity by the local authorities. He is chief of the great monastery of Genden. The persons privileged to take a part in the selection and recommendation of the Genden Tapa, for his holy office are the Noume-hen, the two Ampas and the four Shapees. They propose him for election to the Grand Lama, after his approval, the Ampas procure his appointment from the

* Principal Goompas at Lassa and its vicinity.

Genden Goompa, . . .	3,500	Lamas resident and itinerary.
Lea,	5,500	„
Depoong,	7,500	„
Gentoo,	500	„
Grume,	500	„
Chenamge,	1,000	„
Chalang,		
Chemchung,	200	„
Kandooling,	200	„
Tengelling,	200	„
Chechooling,	300	„
Moujida Taching, . . .	1,000	„

† Gealchup Noume-hen is the proper title which being translated is “the image of Grawa” or the Grand Lama.

emperor. The Genden Tepas, is chief Lama of a Goompa, but not an awatari Lama.

Next in rank and power to the Noume-hen are the four Shapees. They are not Lamas, always Thibetans, and the principal executive officers of the Government in the Financial, Revenue and Judicial Departments. These departments are not separated and under distinct officers. The Shapees are the highest Judicial officers in the Civil and Criminal Courts. Next to the Genden Tepas is the "Lama Yeungjing" the private guru, or high priest of the "Grand Lama." He is also appointed by orders of the emperor, and is sometimes an awatari Lama, but not always. His office is to teach and train the Grand Lama in childhood and youth, and lead him, if he can, afterwards. This is indeed an important personage in the Bhuddhist world, being no less than the keeper of the Grand Lama's conscience. The nomination to this post being in the hands of the emperor, furnishes an interesting clue to the extent of the imperial power over the church of Thibet.

The Che kap kempu Lama is a churchman of great influence in the Government. He appears to represent the Grand Lama in the council of state and in the deliberations of the Shapees. He may be called Secretary or Minister for the church, and the Shapees may, correctly enough, be called the Financial, Judicial, Revenue and Home secretaries or ministers.

The Treasury is managed by two officers named Jhassas; both are Lamas, and act conjointly, although one of them is Treasurer on behalf of the "Grand Lama," and the other on behalf of the Noume-hen or temporal estate. They are assisted by two Sub-Treasurers styled Shangjotes. Four officers designated Da-puns are the commanders of the Thibetan Troops, and act as Civil and Political Commissioners on occasions of Frontier or other disturbances, they are Thibetans, and not Lamas. The ordinary course of official promotion is from a Da-pun to a Shapee; of equal rank, to the Da-puns is the Che-pun who is however a Civil officer and acts in all Departments as Deputy to the Shapee.* This officer is often employed as Commissioner on Deputations in Civil affairs either Judicial or Fiscal,

* Shete Shapee is the energetic Commander-in-Chief of the Thibetan army now opposed to the Nipalese under Jung Bahadoor.

and all the cases sent up by the Police for trial before the Shapees are forwarded through this officer. All appointments to the offices above noted, require the confirmation of the emperor.

1. *Tinkpun*—Superintendent of Police and Jails.

2. *Sherpankpa*—Assessors to the Superintendent and to act as checks on his proceedings.

3. *Boopun*—Military officers subordinate to the Da-puns but also employed in Civil affairs when required.

4. *Jongpuns*—Collectors of Revenue and Magistrates in the interior. They hold office generally for three years only. They are all laymen, one of these officers who is employed in the district of Gar known to us as Gartop, is named the Garpun. He has charge of the salt and gold-diggings in that direction both of which are valuable. In the Kampa country to the East of Lassa, these officers are styled Markam teje.

5. *Giapuns*—Subordinate Military officers, Non-commissioned.

6. *Dingpuns*—Ditto, ditto.

7. *Choopun*—Ditto ditto. Privates are called Ma Mi, which means "fighting men."

The patronage of these 7 classes of officers nominally lies with the Gcalchup Noume-hen, but the Chinese Ampas have a veto if they desire to exercise it, and the working of the system is to procure the approval of these high officers to the appointments before they are made.

One of the Ampas annually visits the Nepal and Ladakh frontiers.* The Noume-hen and the four Shapees have the entire control of the land assessment, commerce, customs and other sources of revenue, and, I believe, that no account of the revenues, or the disbursements of Thibet are required by the Emperor. The Chinese Troops and

* In 1846, Keshen was the only Ampa or representative of the Emperor in Thibet but he was one of the eight Tongtongs of the Empire and specially deputed to arrange Thibet affairs at that time and the usual system of two Ampas was then suspended. The following anecdote of Keshen is very characteristic of the self-deceiving system of the Emperor's Government. When Keshen was ordered to be executed for having sold the interests of his country to the English during the War, his life was spared at the entreaty of "Sac Lama" the friend of the Emperor "Taokwong" and sentence of banishment in chains was substituted. Subsequently

all the Chinese officers in Thibet are paid by China and in money ; the Thibetan Troops by assignments of the Government share of the land tax. There is no money Revenue sent to Pekin, an annual Embassy with presents only in cloths, images, books, incense, &c.

There is a fund in Patala Goompa to which 100,000 rupees is added annually. Never opened except in time of great war expenses, it was opened to repel Zorawur Singh the Sikh General, who invaded Thibet from Cashmere in 1842. The Ampas pay is 140 Rs. per day, and he gets large presents while travelling in Thibet.

A Shapee's pay is 140 Rs. per mensem from China, and he has lands and other emoluments from the Grand Lama.

Army.

They have no Artillery in Thibet ; the Cavalry so called is mounted on ponies ; the principal troops are Infantry and great pains are taken to make them good marksmen. Prizes and promotions are the invariable rewards of good marksmen. The Chinese or Tartar troops are kept quite distinct from the Thibetan ones, which are only a Militia called out when required, and not regularly paid. The Imperial Troops quartered in Thibet do not exceed 4,000 men, and the Thibetan force is not so strong. There are 2,000 Imperials at Lassa, 1,000 at Digarchi, 500 at Giangtchi, and detachments at Phari, and Tingri. The last named post, is on the high road from Cathmandu to Lassa, and is situated on a Plateau called the "Tingri Maydan" by the Nepalese. The Imperial troops are armed with long matchlocks, to which a rest is attached. The Thibetans have very few firearms, being provided with bows and arrows, and short swords. The powder is of a very inferior description, and it does not appear that the troops are ever practised in military manœuvres.

at the urgency of the same Lama, Keshen was appointed viceroy to Thibet. Affairs at Lassa, and throughout Thibet were in great confusion at the time ; three Grand Lamas had died by poison in a few years and the Noume-hen was suspected of the crime. Keshen had the opportunity given him of redeeming his fame, and he did so by re-establishing order in the country, and convicting the Noume-hen. It is a curious fact, however, that he proceeded from his banishment in Manchouria to his Government at Lassa *in chains*, that is to say, he wore a gold chain, the badge of punishment round his neck, concealed by his garments, nor was it removed, and his forgiveness complete until after he quitted Lassa as Governor of Sechmen.

Personal Habits, Customs and Ceremonies of Thibetans.

The Thibetans of the higher class wear Chinese satins in the warmer seasons, and the same lined with fur in the cold ; all others, male and female, wear woollens in the warm, furs and sheepskins in the cold weather, and never go about without boots. The men do not go about armed. The common people never wash during the cold season ; very sparingly at other times. The reason given for this being that the skin of the face cracks and ulcerates from the cold, if water is applied to it. The people of towns, who do not go much outside the house, wash occasionally, but the universal prejudice is strong against ablutions of the person, and it is equally extended to their clothing which is worn in a filthy and greasy state.

Soap is high priced and little used in Thibet ; it is not manufactured there. The supply is from India, through the Cashmere traders viâ Ladakh, and from Nepal. A small quantity also goes from Bengal through Bootan and Sikim. There is a grass in the country or a plant like grass, the root of which pounded with water, makes a lather and is used for washing clothes.

Travelling in the winter and indeed generally is performed on yaks. The women ride astride on them like the men, and they are so masculine and dressed so much alike that it is difficult to distinguish between them.

A Thibetan village or town is never surrounded with filth, as in India. To every house there is a privy, and the contents are carefully preserved for manure. In some situations, where the soil is suitable, saltpetre is made from the earth about the privies, but the regular supply of this article, which is used for making gunpowder only, goes from India.* In towns the contents of the privies are sold annually, and those of people of wealth sell highest.

It is well known that the dead are not burned or buried in Thibet, but exposed on high places to be devoured by vultures. For this business there is a class of men who make it their sole vocation. They

* At the time of the Sikh General, Zorawur Singh's disastrous incursion from Ladakh into Thibet as far as Gartope, 1842, there was a good deal of saltpetre taken into Thibet through Sikim, also sulphur and lead bullets.

are called "Raga Tongden;" they are a low race held in dislike and shunned, but they are generally rich. They go about to the living, begging and extorting money. When refused or ill-treated, they retaliate with abuse which is often successful. "Very good," say they, "you won't give us alms now, you will come into our hands some day, and we will put a rope round your neck, drag your body through the streets, and throw it to the dogs," and the latter part is the frequent fate of the poor man's body, as these men keep numerous dogs to devour the bodies.

The bodies of the wealthy are carefully disposed of; they are carried in a litter to the top of a hill, set apart for the purpose, the flesh cut in pieces, the skull and bones pounded in a mortar, and when all is ready a smoke is raised to attract the vultures, who collect in thousands to eat it up.

The Chinese have spacious burial grounds at Lassa, and Digarchi, and there, as in their own country and wherever they reside, they are well cared for and ornamented. The Lassa one is said to contain 100,000 tombs. In the time of Wangh, a celebrated Raja of Lassa, there was an insurrection against the Chinese which ended for the time in the annihilation of the whole army, and the massacre, by the Thibetans, of the whole Chinese population. The funerals of the Chinese at that time were estimated at 4,000. This massacre was punished by the Emperor with signal vengeance, and since that time the Chinese supremacy has been finally established all over Thibet. There was a petty insurrection in 1843, in which many Chinese were killed.

Religious Festivals.

There are twelve great annual Festivals, viz. Bumteung, Kansupecha, Chúchupecha, Gesúpecha, Nesúpecha, Gosúngpecha, Gyajeepecha, Lallúpecha, Chindúpecha, Dúdúpecha, Kagyurpecha, Lukphopecha. * Pecha is equivalent to Pujá.

On the anniversary of the death of a Chief Lama of a Goompa, there is a great festival and illumination. At Tashi Lumbu, three such are held annually.

The "Lassa Morun" festival of M. Huc is properly called the "Lha-sa Meuhlum." It is the anniversary of the first proclamation the Religion of Boodha by Sakya, at Lassa.

Seasons.

The year is divided into four Seasons. First Chid, or early Spring, February, March and April. Second Teuh, or Spring proper, May, June and July. Third Yirrh, or Rains, August, September and October. Fourth Gunh, or Winter, November, December and January. Some showers and southerly winds occur in Chid. In Teuh, it is temperate and dry, but showers, thunder and lightning* occasionally prevail. In Yirrh, there is constant but not heavy rain and hail in September and October. Frost begins early in November and increases all through the winter. Heavy falls of snow are rare except on the mountains.

Soils.

Only three kinds of soil are recognized; a blackish one, a reddish one which is described as rather clayey, and a greyish coloured one, which is also clayey and contains a good deal of sand. The last is found along the beds of streams and yields good crops. The reddish soil is also fertile; it frequently contains gravel and stones; it is the prevailing soil in the tract called Dingcham, which extends along the northern face of the great Himalayan chain from Tawang to Keroong, but this region is quite barren. Mean elevation 16,000 feet at least. The blackish soil most abounds in the districts or provinces of U and Chang; it is the most fertile of all, but also contains stones and gravel.

The fertility of the culturable soil is highly spoken of, and 40 to 50 fold in wheat is considered the average. Crops are generally very certain, and blights or other accidents rare. Early frost sometimes overtakes the harvest and spoils the grain, when the grass is at the same time burnt up, and this causes scarcity and famine. It is then the granaries are opened, and the corn-merchants make their fortunes. There is no interference with the price of grain. It is always dear compared with India, but varies considerably; and the principal cause of scarcity appears to be the early setting in of

* In 1845, a great earthquake was experienced in the Province of Kham north-east of Lassa. It was most severe in the district of the Dirgi Raja. About 3,000 men were killed, and a Goomba destroyed by the opening of the earth.

About 20 years ago, the district of Kompo in the Province of Kham was visited by a severe shock; one village was destroyed by the opening of the ground.

frost. This is said to be induced by continued clear nights which are greatly dreaded in harvest time.

Agriculture.

Wheat, barley and other crops sowed in April and May are reaped in September and October ; all are irrigated. The peach ripens at Lassa in October and November. It is sun-dried and preserved. No grapes are grown at Lassa. The whole supply of raisins is received from Ladakh. The plough is used in all old cultivations : yaks, bullocks and ponies occasionally are trained to it. The plough is the same as the Indian one, made entirely of wood, except the sock which is pointed with iron. Timber for ploughs is imported from Sikim and Nepal. *Rhododendron Hodgsoni*, and birchwood make the best ploughs. Cultivation in fresh lands is done with the hoe. The Thibetans do not use a harrow, the grain being covered in with hand.

Barley in Thibet takes the place of potatoes in Ireland ; four-fifths of the population live on it.

Neither wheat, barley nor peas will come to maturity as a paying crop in any part of Thibet without irrigation, and the water flooding of the fields, by which they derive a fertilizing effect from the frost, is equally necessary to prepare the soil for these crops. Wheat requires three or four irrigations or waterings from the time the seed is sown till the ear bursts, after which it will ripen without further watering. The flooding of the lands in winter, and watering of the crops in summer are principally effected from drains or canals cut from the rivers : very little watering is performed from wells. The whole of the arable lands along the Painom river and the most of it on the Yaroo Sanpoo are terraced and have maintaining walls of stone raised a little above the surface of the fields. Great pains are taken for the equable distribution of the water by running it off from terrace to terrace, and it is applied from leather bags when it cannot be brought to run on particular spots. Watering freely is indispensable to all crops in Thibet. The atmosphere is so dry and the soil so destitute of moisture, that without it the sun burns up the crop before it comes to ear. In a land of so little rain and with an atmosphere so dry and sun so scorching as to render irrigation and free watering indispensable, the questions which naturally arise are, What extent of area can be watered from the rivers by canals and

drains ? and Is there more arable land in Thibet, than admits of being irrigated from the rivers ?

To answer the first question, it would be best to refer to the statistics of the Nile irrigation, in illustration of the extent to which land on either side of a river may be irrigated by artificial means, not by the overflowing of its banks which is not usual by the Yaroo of Thibet, and is therefore not be taken into the comparison. I have not the means of making this comparison. But to reply to the second question I have taken much pains to collect facts, the most prominent of which are as follow :—

1st. The culturable land on either bank of the Painom river, from its source to Digarchi, has not a maximum breadth anywhere of more than four miles, i. e. eight miles in all for the extreme breadth. In many places however, the river is closely confined by mountains.

2nd. From Digarchi to Giangtchi on the Yaroo one day's sail, the culturable land on either side the Yaroo varies from two to four miles.

3rd. From Giangtchi till the Yaroo escapes from the Kambola range, its course is exceedingly tortuous, generally through great mountains, and it has but a very narrow bed of culturable land in a few places. It is closely pressed in by great mountain ranges in the Kambola district, and elsewhere in this portion.

4th. I allow the utmost extent of culturable land ever given to me by an informant for the Yaroo valley from the point at which it leaves the Kambola range entirely to the junction of the Kechoo or Lassa river ; and that is a total breadth both banks included varying from 20 to 40 miles. There is more flat land on the South than on North bank of the Yaroo.

5th. The Kechoo River is closely hemmed in by mountains on the Eastern bank ; on the Western bank it has a belt of about 4 miles of culturable land only.

These particulars will afford some assistance for reckoning the culturable area of the finest part of Eastern Thibet, and will shew it to be very small indeed, compared with the total area of this rugged country, and it is universally asserted that the land is everywhere dependent on river irrigation for its fertility. On this subject M. Huc says "Poulon, fine purple cloth, scented sticks and wooden

bowls are the only good manufactures, neither is their agricultural produce remarkable Thibet, being almost all covered with mountains and intersected by impetuous torrents, furnishes its inhabitants with but little soil suited for cultivation, the valleys alone can be sowed with any prospect of reaping a harvest." When the Yaroo does overflow its banks, the sediment it leaves, is fertilizing. The Yaroo soil deposit is generally light and sandy.

Three feet of digging brings you to the water at Digarchi which stands in the flat and low Delta of the Painom and Yaroo rivers. 20 feet is required at Kambajong.*

Many Thibetans believe that the Painom rises in Sikim, but its sources are no doubt, as given by Turner, in the vicinity of the Ramchoo Lakes, north of Phari. A horse Dak is four days from Digarchi to Lassa, a boat by the Yaroo takes 12 days to the disembarking place, nearest to Lassa. It is 12 days' journey to the Salt Lakes from Digarchi, due north.

Crops, Rotation of, &c.

The number of crops is very limited ; wheat, barley, buckwheat, peas, turnips and a little mustard, comprise the whole. There is no regular rotation observed. As in India with all crops, so it is in Thibet. Wheat is grown for generations in the same ground varied, in some places, by barley or buckwheat ; about three times as much barley being grown as wheat. All the suttoo eaten with tea is roasted barley, and this may be considered as the staple article of food for all travellers. See M. Huc *passim*.

At Digarchi, Giangtchi, and generally in the Province of Chang or Tsang, grain is more plentiful than in the neighbouring province of U ; in the former 10 to 15 seers, (20 to 30 lbs.,) of wheaten flour per Company's Rupee is reckoned cheap, and in the latter about half the quantity is so.

The dung of animals is so much in request for fuel, that scarcely any is used for manure, nor is there any spare fodder or other vegetable matter available for composts. Human ordure and ashes are therefore the principal manures in use ; both are carefully preserved, and very valuable. In the towns the contents of public privies are a source of revenue to the Government, and lodging-houses have

* Kambajong a Police Station in Dingcham. See Hooker's Himalayan Journals and Map.

privies attached to them which are most jealously watched. The contents of these places are removed by a class of people who principally live by the occupation, and are the filthiest of all the population, which is everywhere and in every grade, very dirty. They work with their hands at their vile occupation and in the middle of it unwashed may be seen drinking hot tea, and eating raw and sun-dried flesh close to the piles of ordure. Ashes are mixed with the ordure, and this is reckoned the best of all manures. Liquid manure, (ordure with water,) is also in use, but sparingly. This mode of using manure is probably taken from the Chinese.

Scarcely any weeding is required, as the crops grow nearly free of all weeds. When necessary, it is done with the hand, the weeds being carefully preserved for the cattle.

The Thibetans reap with an untoothed sickle, the crops being all cut close to the ground to save the fodder. Wheat is tied up in small sheaves and stocked on the ground, or in yards near the houses. The corn is beaten out by the flail as in Europe, the women taking a part in the threshing with the men. This is done with great care, so that not a grain is lost. There is also a kind of hackle used for beating out the corn. A beam 8 or 10 feet long toothed with iron spikes, through which the sheaves are drawn. The winnowing is performed in the open air.

The grain is ground into meal by watermills. In some villages, mills are built by subscription, and the parties use them in turn. There are public mills also. The millers in these take one part in 20 as payment. There is a great press at the mills for two months after the harvest, when they are going day and night, as frost sets in in November so hard that they cannot be used again till the spring. There are no windmills in Thibet I believe, although in no country in the world, I believe, is there a more steady wind in the cold season, than here.

Wages of Labour.

A Chinese soldier is very highly paid in Thibet, i. e. he gets as much as 12 to 16 Company's Rupees per mensem. The Thibetan soldier has no regular money pay. He is allowed the Government share of revenue on a portion of land, his own farm or another, and this does not exceed 40 or 50 Company's Rupees per annum.

Masons, carpenters and other artificers can earn from 8 as. to 1 Rupee a day in the towns; common labourers three and two annas. Gold and silversmiths are highly paid, 8 as. in the rupee for fine work is the usual rate.

Breads, &c.

The bread is all unleavened, and cooked on heated stones or grid-irons. The poorer people make their bread with coarse wheaten flour and water, the better classes with fine flour and butter. The latter description I have eaten; it is a sort of heavy biscuit, made in a long twisted loaf-like shape. The sweet and pure farinaceous taste of the fine flour of Thibet equals the best Cape or American flour. Rice is only eaten in Thibet by the Chinese, and the richer Bhotias. The whole supply is received from Bootan and Sikim. The Thibetans do not cook and eat it plain as the Indians and Chinese do, but make it up into large balls with butter and sugar using it as a pudding and sweetmeat. The staple food of the country is "Champa," called Suttoo in India; it is finely ground flour of toasted barley. It is universally eaten and without additional cooking, and is excellently suited to the people of a country which is so ill-supplied with fuel. Mixed up with hot tea and formed into solid balls, it is called "Paak." Prepared with lukewarm water, it is called Seu. Travellers often carry the "Paak" ready made in skins, and eat it as they go along, but if it is possible to get fuel, they prefer making a jorum of tea, and having the paak warm and fresh. The Thibetans are great eaters when they are in plenty. Tea is drunk at all houses, and at every meal, and is regularly used four times a day, i. e. in the morning early, about 8 A. M., at noon, and in the evening. For breakfast which is always eaten at daylight and before washing of hands, face or mouth, the favourite dish is Tookpa, a sort of broth, made with mutton or yak's flesh, Champa, dry curds, butter, salt and turnips. This is eaten without bread, and followed by a cup of scalding tea. They never drink tea when it is the least cold, and if a foreigner allows his cup to cool and then drinks it, he is considered a very careless fellow. An attendant is always on the watch when tea is being served, and as you proceed, he replenishes your cup with a ladle or from the hot teapot until you cry "Hold, enough," or

empty out your cup, and put it in the breast of your cloak, the usual receptacle of many necessaries to a Bhotia. The snuff bottle, thick woollen nose cloth, tea cup, bits of dried flesh, &c. are all huddled here, without remorse, and it is a most filthy receptacle.

Salts, Minerals, Metals, &c.

1st. *Peu*, a carbonate of soda, is found all over Dingcham and Thibet, south of the Yaroo; it appears as a whitish powder on the surface of the soil, never in masses under ground. It is not used to make soap or otherwise in the arts, a small quantity is always put into the water with tea; it is considered to improve the flavour, and it gives a high brown colour to the decoction. It is generally used in medicine.

2nd. *Chulla*, Borax. I cannot learn that borax is produced in any part of Thibet south of the Yaroo river. The general direction of the Yaroo is easterly. It is largely imported into Digarchi, whence it is distributed to other parts of Thibet and to India via Nipal, Sikim and Bootan, whence it finds its way to Calcutta and Europe.

3rd. *Sicha*, Saltpetre, is produced generally in Thibet and manufactured at the large sheepfolds where composts of sheep's dung and earth are formed to produce it.

4th. *Moghee*, Sulphur, is not found in Thibet. India exports this article for consumption at Lassa where gunpowder of good quality is made. The charcoal of the poplar—(*changma*,) and of the willow—(*langma*,) are considered the best for gunpowder, and this is fortunate, as these two trees alone attain to any magnitude near Lassa.

5th. *Lencha*, common Salt. Three sorts are known in commerce.

1. *Sercha*—White and best.
2. *Chama*—Reddish and good.
3. *Pencha*—Yellowish and bad, contains soda or magnesia and earthy matter.

All the salt consumed in eastern Thibet is the produce of lakes or mines situated to the north of the Yaroo river, or comes from "Lache," a district lying between Digarchi and Ladak, which is traversed by the Yaroo. The best information procurable is to the

effect that all the salt of Thibet is the produce of lakes; still there are people who assert that it is also dug out of the ground. Possibly this is confined to the vicinity of the lakes or to their dried margins. All travellers in Thibet are agreed that the salt-producing districts are the most rugged and inaccessible that can be imagined. It is quite true that men and sheep only can reach the salt deposits. It is also true that the elevation of the deposits prevents their being worked, except for the warmer half of the year, April to November. Thousands of sheep are employed in carrying the salt from the deposits to places accessible to yaks. These latter animals carry it all over Thibet in loads up to 160 lbs. Sheep in open places will carry 20 to 24 lbs.: in the vicinity of the deposits the ruggedness is so great that 8 to 10 lbs. is as much as can be safely put upon them.

Snow falls annually after November in the salt-producing tracts and covers the ground for two months or more. The elevation of these places cannot, I believe, be under 22,000 feet.

At Digarchi, 1st quality, 2 Rs per maund, or 20 lbs. for 1 shilling.

At Giangtchi, 20 per cent. dearer. At Lassa, 5 Rs. per maund, or 8 lbs. for 1 shilling.

These prices indicate the relative distances of the places named from the salt districts. There are no available means of ascertaining the actual distances. Digarchi, the nearest mart may be twenty days' journey on horseback from the nearest salt lakes. See annexed Route No. 1, of 55 marches for loaded men. (p. 334.)

It is believed that salt is now in course of being deposited in a lake at Tinke in Dingcham—near one of the sources of the Arun river, but it is not worked, and great pains are taken to conceal the fact, as there is a prophecy that whenever salt shall be found in the lakes of Dingcham, the glories of Thibet shall be on the wane; which means that a rush shall be made from all sides for the salt which will render the exclusion of strangers ineffectual. Salt is given to sheep and cattle in Thibet, but not to horses.

6th. *Dok so*, which in the Thibetan language means "Stone charcoal." Coal is no where found in Thibet. It is known in that country as a produce of China which is seen at Siling, and other marts on the Thibetan confines of China.

7th. *Ser*, Gold; is found in the sands of a feeder of the Yaroo which joins it on the Northern bank. The name of this river is not known to me, but it flows from a country called "Shapduk" and falls into the Yaroo to the west of Digarchi. The greater part of the gold of Thibet is the produce of mines or diggings. See Route No. 2, from Digarchi annexed. (p. 334.) The Yaroo itself does not yield any gold-washings. There are no mines of iron, silver, copper, quicksilver or lead in Thibet. All these metals, and their oxides are imported from China.

8th. The yellow Arsenic of commerce is found at Teloongchurfoo, near the borders of China to the North and West of Lassa; it is called Pabea.

9th. *Peu-she*, Amber. The Thibetans always wear large opaque amber-like beads in their necklaces; but the substance is not a produce of their own country, nor is it amber; it is, I believe, expissated turpentine—gundaferoza, mixed with some hardening material. Friction makes it smell of turpentine. It is brought from Siling and other marts of China.

10th. Turquoise, *Gya yen*, or China stone.

Pe yeu, Thibetan stone.

Te yeu, Cashmere stone.

This beautiful stone is greatly prized in Thibet, and every one wears it, real or imitation, in rings, necklaces, earrings and amulet cases. The best are very rare, and although found in Thibet, I believe, no one can give an intelligible account of the localities. I do not believe that the turquoise is a natural product of Thibet, and the following story corroborates the opinion.

"A great merchant of Thibet named Chongpo who traded, ages ago, with India, and once crossed the seas beyond India, brought the finest real turquoise to his native country. From that time the stone has been known there, and like coined money, it continues to circulate in the country as a medium of exchange." The imitations brought from China are made of common earthen-coloured or other compositions. They are easily detected. Those imported via Cashmere are real stones but not valuable. The only test of a real stone is to make a fowl swallow it; if real it will pass through unchanged.

Route to the Salt Mines in Thibet.

Digarchi to Punchooling 3 marches. Direction at Digarchi N. W. across the Yaroo.

Amringjong, 4 marches. Direction, N. W.

To Nakchang, 8 ditto, N. W.

Sang-zang Lhoda, 6 ditto, N. W.

Sakojong, 7 ditto, N. W.,

To-then, 8 ditto, N. W.

Bomet, 3 ditto, N.

Lon-kurqun, 10 ditto, N.

Tarokchan, 2 ditto, N.

Borgpagege, 8 ditto, N.

To Salt mines, 1 ditto, N.

Being 55 marches for loaded men, each 10 miles, say.

Route to the Gold diggings.

The same from Digarchi as to the Salt mines as far as Sang-zang Lhoda, thence to Kasha 10 marches, N. by W.

To Komunk 5 ditto, N.

Two more marches to Gold diggings, N.

These marches are somewhat longer than the former ones, and may be each 12 to 15 miles.

Animals.

The Goa—An antelope.

Gnow—The *ovis ammon*.

Rigong—Hare.

Kiang—Wild ass.

Lawa—Musk deer.

Shao—A large deer, *Cervus affinis* vel. *Wallichii*.

Cheu or *Chiru*—Antelope *Hodgsoni*.

Dong—The wild yak of Thibet. The fiercest of all known ruminants. It will rarely allow a man to escape alive if it can come up with him. It is generally hunted on horseback, the great aim being to detach one from the herd. It affects open grassy places and goes in large herds. The following is the plan adopted by hunters on foot for killing the "Dong."

Its favourite pasturages are ascertained, and in the midst of these the hunters throw up circular enclosures of stone a few yards apart,

the hunter taking up a position in one of them. When a "Dong" is within shot, the hunter having fired at him, instantly quits his enclosure for another; for as soon as the animal hears the shot whether he is hit or not, he, guided by the smoke of the discharge, rushes furiously on the enclosure, and commences knocking it to pieces. When the hunter gets another shot at him he retires again from his shelter to a fresh enclosure, and so on, till he has killed his beast. The ordinary size of the "Dong" is four times that of the domestic yak, it is black all over, having occasionally a white streak in the forehead. The horns of a full grown Bull are said to be three feet long, and the circumference must be immense. The common mode of describing it is to throw out the elbow, bring the fingers to the ribs and point to the circle thus formed as the size of the base. It is used by the *grande*es of Thibet at marriages and other feasts, when it is filled with strong drink, and handed round to the company. Nothing more commendatory of the host's joviality can be said, than that "he regaled his guest out of the Dong's horn."

The horns so used are finely polished, and mounted with silver, or gold, and precious stones. If I ever succeed in getting one, I shall certainly present it for a "snuff mull" to the Highland Society, as the days of drinking in horns are over with us now.

It is common in Thibetan goompas—(Lamaserais,) to see a stuffed "Dong" standing in front of the image of Mahá Káli at whose shrine the animal is thus figuratively sacrificed; axes and other instruments of sacrifice are ranged around the image. Strange that Buddhists should preserve *this* feature of Hinduism in their places of worship, not more so however than, as Huc describes that a Lama should nearly go into fits on seeing a louse from his tunic impaled for the microscope, while the whole of his countrymen and co-religionists are among the greatest slaughterers and consumers of butcher's meat in the world.

Pegoo—the yak,

Cow—small, like the cow of Bengal. Hair long.

Sauh—cross between cow and yak.

Sauh Yak—produce of cow by yak bull.

Ba Sauh—produce of female yak by bull. These are great milkers, better than yak or cow; tail half-cow, half-yak. Females give

young with bulls or yaks, best produce with yaks. Elevation of shoulder less than in the yak. Hair long but less so than the yaks.

Look—sheep, four principal varieties; 1st, Chang Look, or Northern sheep, very large with fine wool. Flocks of 400 to 1000 tended by one man;—2nd, Sok Look, rare, but greatly prized; it is a doomba or heavy-tailed sheep, comes from the province of Sok situated to the east of Lassa; wool not very fine;—3rd, Lho Look, a very small sheep indeed, generally white, sometimes black, is bred principally about Lassa; wool very fine and like the shawl wool;—4th, Changumpo Look; abundant about Geruo and in Dingcham, generally very large. I never saw finer sheep in my life than all these were; white wool very fine and soft. The flesh of all the Thibet sheep is fine-grained and good.

Peu Ra—Thibet goat, small, hairy, of all colours. Has an under coat of fine wool, similar to the shawl wool, but there is no shawl wool trade from Eastern Thibet to India at present. Flesh pretty good.

Phák—pig, two varieties. The Lho Phák or southern pig which is most abundant to the south of Lassa, and is described as similar to the Indian village pig, and the small China pig now abundant in Lassa and other towns: no wild hogs anywhere in Thibet. The Chinese butchers in Lassa blow their pork and take in the country folks greatly by its fine appearance.

Cha—common fowl, generally small in Thibet, and there is no large kind as in Sikim where the fowls are remarkably large.

Damjha—ducks. Not eaten by the Thibetans, but greatly prized by the Chinese, for whose use only they are bred near and in Lassa.

Damjha Cheemoo—goose. Not eaten by the Thibetans, but much liked by the Chinese.

Gang Sir, Gung Kur, Chaloong, Tjong Tjong—Comprise the numerous wild fowl, swimmers and waders, which migrate from India in March and April, and return in October and November; they are all eaten, but not extensively. There is a sort of prejudice against killing them; but as they all breed on the lakes and rivers of the country and are most numerous, the eggs are found in great quantities, the people who live by gathering and selling these eggs never

rob a nest of *all* its contents, but take about half the eggs. This forbearance arises from the general aversion to taking life which prevails in Thibet, and it has its reward as it is supposed that the birds if entirely deprived of their young, would not again return.

Chungoo—a wild dog, reddish colour.

Koong—the Civet, is brought from China and inhabits the Chinese borders of Thibet. It is mottled rather than striped.

Sik—leopard. Thibet or contiguous countries.

Tagh—tiger, ditto ditto.

Somb—bear. A red and a black species.

Nehornehu—a large sheep, or goat, or antelope. I do not know which, is found in the very rugged mountains north of the Yaroo river, and in the neighbourhood of the salt mines or lakes. Is four feet high, has very large horns, sloping back, and four feet long, has a tail 15 inches long, is shaggy, and of various colours, sometimes black and red.

No leeches, musquitoes or peepsas in Thibet; and maggots or flies are never seen there. There are no bees or wasps in Dingcham or Thibet proper. In the valley of Choombi, a good deal of fine honey is found, which is exported to Thibet.

The lakes in Thibet are full of fish, one kind only is described, it grows to the weight of 8lbs.; it is named "choolap," it is not well flavoured or delicate. I have sent specimens of it to the Asiatic Society of Calcutta, and by Dr. Hooker to Sir J. Richardson. Enormous quantities are taken by the hand in the winter season; when the lakes are frozen over, a hole is made in the ice to which the fish immediately rush, and are then pulled out by the hand. Salt is not used to preserve fish, they are gutted, split up, the tail put in the mouth and allowed to dry in the open air, they keep in this way for a year. The principal lakes on this side the Yaroo are Yamdo Yeumtso, Ramchoo, Kala, and Chomotetoong near Dobta.

● *Sheep grazing, &c.*

The number of sheep in Thibet is extraordinary. The flocks are immense, and a person of no consequence whatever will have 2,000 or 3,000 sheep. The large owners have as many as 7,000. The fleece is taken once a year in May or June. The ewes breed twice a year. The great lambing season is in April and May. The other

in October and November, many of the autumn lambs die from the cold, but this is not considered any great loss as the skins are so valuable. A cloak of lamb skins made of fourteen skins is worth 25 Thibet rupees or 10 East India Company's Rupees.

The rams remain with the ewes always, but after the ewes are in young, the rams have a sort of breeching put on. My informant's notion is, that this is done to prevent annoyance to the pregnant ewes, but I suspect that they are kept in this way, until the proper season for letting them to the ewes. The allowance of rams is two or three for every hundred ewes. The males are gelded when quite young or up to a year old, the prices vary from 5 to 7 Thibet Rupees per head, i. e. 2 to 3 rupees of ours.

The Government dues on sheep farms is 10 per cent. in kind every three years, this is in addition to a general tax of 1 rupee per door on all houses per annum.

During the summer season, but little fresh meat is used. The Thibetans do not like it boiled, and are not partial to it raw unless it has been dried. In November there is a great slaughtering in the towns, and a wealthy man in the country will kill two hundred sheep at this time for his year's consumption, the animal is butchered, skinned and gutted, and then placed standing on its feet in a free current of air. It becomes in a couple of days quite hard, and white, and is then ready to eat. It is kept in this way for more than a year, and undergoes great vicissitudes of climate without spoiling. I have seen it at Darjeeling in the rains quite dry and hard, and in no way decomposed. When long exposed to the wind of Thibet it becomes so dry, that it may be rubbed into powder between the hands. In this state it is mixed with water and drank, and used in various other ways. The Thibetans eat animal food in endless forms, and a large portion of the people eat nothing else.

The livers of the sheep and other animals are similarly dried or frozen and are much prized. To a person unused to the dried meat of Thibet, the liver is represented as peculiarly distasteful; it is bitter, and nearly as hard as a stone.

The fat is simply dried, packed in the stomachs, and thus sent to market or kept for home use.

The skins furnish clothing for the working classes and servants. All classes in Thibet put on furs of some kind at the commencement of the winter. It is not reckoned reputable to kill your own meat, and therefore every hamlet has its professional butcher. In towns it is a great trade from the enormous quantity of meat consumed. Some butchers will have five hundred carcasses dried and ready at their stalls. The trade of a butcher—Shempa—is hereditary and strange to say a despised one.

The horns of animals are not turned to any useful purpose in Thibet. Small houses are built in the suburbs of Lassa with horns and clay mortar. Goats are also reared in considerable flocks, but principally on account of their milk. The flesh of the sheep is infinitely preferred. The milk of yaks, cows, sheep and goats is used alike for making dried curds, and the various preparations of milk used by these people. The milk of mares does not appear to be used at all in Eastern Thibet, although ponies are extensively bred there. The number of other cattle renders it unnecessary. Fowls are of a small breed, and are reared with some difficulty. The large fowls of Sikim and Bootan are much prized there. The Thibetans do not care about fowl as an article of diet, and it is only since the period of the Chinese supremacy that fowls, pigs, or fish have been used by them. Even now in the places remote from Chinese posts pork and fowls are not to be had.—The Chinese must have pork, eggs, and fowls, and around Lassa, Giangtchi, Digarchi and other places and their stations, these are reared for Chinese consumption.

Diseases.

In July and August severe fevers are not uncommon. Cholera is not known; dysentery is, and is often violent, sometimes proving fatal in four days. Cough and diseases of the chest are not prevalent.

Ophthalmia is very prevalent and very severe. Itinerant ocalists go about the country and are in good repute: they never perform operations, but cure by application of unguents and washes. Three days travelling in the snow without hair-blinds is sure to produce ophthalmia.

Skin diseases are by no means common, although the people are so filthy in their habits. The most dreaded and the most fatal of

all diseases is the small-pox. The people fly the infection, leaving their homes in the most inclement weather. Inoculation is regularly performed annually in the warmer seasons. Two methods are in use, one by incisions on the wrist, the other is effected by inhalation. A plug of cotton which has been impregnated with small-pox virus and dried is introduced into the nose and left there for two or three days, at the end of which the symptoms of the small-pox appear. This method was introduced from China where it is largely practised. Dropsy is rather a common disease, and is generally fatal in the cold season. There is very little Rheumatism in Thibet proper; at Bakchan in Choombi it prevails to a very great extent. There is a malady called the "Laughing disease" which is much dreaded, people die of it. It consists of violent fits of laughing with excruciating pain in the fauces and throat, men and women have it alike and is named "Joomtook" in the language of the country. It frequently proves fatal in a few days, but is not accompanied with fever.

*Report on two specimens of Cuttack Coal from the Talcheer Mines
forwarded by E. A. SAMUELLS, Esq., Commissioner of Cuttack.
By H. PIDDINGTON, Esq. Curator Museum Economic Geology.*

Upon examining the specimens of coal, I find that they are wholly shale, and what is called Top coal, that is coal from the upper and generally inferior beds of a mine.

The shale it is useless to describe, being worthless.

The coal (Top Coal) varies much, some of it being composed of layers in which there are about equal parts of layers of shale of a dull black and of good bright bituminous coal. In other bits, the bituminous coal greatly predominates, and gives good promise that at a moderate depth, a really good coal might be met with. We can say nothing as to what the quantity might be.

The bituminous coal is a bright black glance coal, easily separating into flat sharp rhomboidal fragments in the layers, which in the forceps do not melt or flame, but shoot into singular ramifications which glow for a considerable time: the smell is that of good bituminous coal. It will not coke at all.

An average specimen of such of the coal as was not absolutely shale, and which I take to be Mr. Samuells' Moalpal coal* gives

Water,	14.87
Gaseous matter,	17.75
Carbon,	85.62
Ash (dark grey,)	82.25
	<hr/>
	99.99.

But the picked specimens of the bituminous coal, which I take to be his Gopalpersad sort? gave a far better result; or rather a very good one which was

Sp. Gravity,	1.42
	<hr/>
Water,	3.25
Gaseous,	36.90
Carbon,	51.75
Ash (fawn coloured,)	8.00.
	<hr/>
	99.90.

This kind of coal then, if a vein or bed of it can be found, is about equal to the good Ranneegunge, but at present the *average* of the coal would not be worth sending to Calcutta for a trial on a large scale as Mr. Samuells enquires; and all that should be done is, to sink a shaft for a good vein. Nothing but the existence of coal and the *promise* of good coal can be predicated from surface diggings on the out-crops of the upper beds only; and in sinking such a shaft, a merely good vein as to quantity and quality should not satisfy the miner, but the shaft should be carried as deep as possible to be certain that the best coal does not lie below; for the best coal is in the end always, the most economical to work.

* The specimens have unfortunately no labels with them, though in two separate packages.

Literary and Miscellaneous Intelligence.

Professor Eastwick has addressed us the following letter on the subject of the criticisms by the Westminster Review of the new Edition of his translation of Bopp's Grammar. He certainly could not have adduced stronger testimony than he has in favour of his character as a translator.

Haileybury College, March 15th, 1855.

SIR,—I observe, in a late Number, you have noticed my new edition of Bopp's Comparative Grammar with the remarks made by the Westminster Review. Will you permit me to state that those remarks are *malicious* and *untrue*. In the first place only the 1st Volume of the 2nd Edition has appeared, whereas they wilfully mistake the old Edition of the 2nd and 3rd Vols. for a new Edition. Secondly, they wilfully insist on misprints as mistakes. E. g. in *one* instance J. Grimm's name which is quoted hundreds of times is misprinted F. Grimm, and they maliciously assert that it perpetually recurs in this erroneous manner of writing. They pretend that I have made Dümmler the Berlin Printer, the Author of some of Bopp's works, simply because in a few cases, where Bopp's refers to them in these words "*in meiner Abhandlung*" (Berlin, bei Dümmler) I have translated "in my treatise (Berlin, by Dümmler)" meaning, published by Dümmler, where there could be no possibility of a mistake.

It would occupy too much of your time, if I was to go through the eight or nine passages, which they have brought forward—*seriatim*, but I hope it will be sufficient to quote the words of *Professor Bopp himself*, of Professor H. H. Wilson and of Dr. Max. Müller, the three perhaps greatest philologists living. The first says, "I am perfectly satisfied with your translation, and have reason to thank you for its clearness." Prof. Wilson says, "the translation has been made with great scrupulousness and care, and it has required no ordinary pains to render in English, with perspicuity and fidelity, the not-unfrequently difficult and obscure style of the original." Dr. M. Müller says, "I have frequently compared your translation with the original, and I can conscientiously say, that few books have been so faithfully rendered into English from German

as this." If, then it appears to the Society, that I have been unjustly treated by the Review they have been pleased to quote,—I trust they will make me amends by publishing this letter in their journal.

I have the honor to be, Sir,

Your obedt. Servant,

EDWARD B. EASTWICH, *Professor E. I. College.*

In a letter received from Major Cunningham, shortly before his departure for England in April last, he announces the discovery of several new coins, "of which the most remarkable is," he says, "an Indian coin of Sapor. The name is written distinctly. The coin is a silver one, of the Kabulian type of Indo Sacsanians. I presume that the coin must have belonged to Sapor the second, whose long reign was so successful against the Romans in the West."

He further mentions a Gold Kanerki with the reverse of OPAATNO and a bad duplicate of the hitherto unique tetradrachm of Diodotus.

Both Major C. and Mr. E. Thomas, on close examination of the fac-simile of the Thanesar inscription translated by Baboo Rajendralal Mitra, in a paper published at p. 673 of vol. XXII of our Journal, pronounce it to be "beyond all doubt a middle age one—that is," says Major C. "the forms of the letters are those of the 11th and 12th centuries. I read the date ११९० S. or 1190 A. D.' The Baboo professed only to read the inscription as it stood on the fac-simile before him: it must be admitted that the character in which it is written is a truer clue to the date than can be given by the best reading of the figures representing the date. But we shall shortly publish the fac-simile with a view to inviting further discussion of the true date of the inscription.

The Stacy collection of coins has been catalogued and valued by Mr. E. Thomas at Mussooree and has been offered to the British Museum.

It is gratifying to find that the N. W. Government has favourably entertained a project, by Mr. Thomas, for publishing in a series the texts of all Persian Historical works on Hindustan.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,

FOR APRIL, 1855.

The Society met on the 4th instant, at half-past 8 P. M.

SIR JAMES W. COLVILLE, Knight, President, in the chair.

The proceedings of the last month were read and confirmed.

Presentations were received—

1. From J. Hodges, Esq. a spear and throwing stick from Swan River Settlement, Western Australia.

2. From Colonel Baker, 21 Indo-Bactrian copper coins.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members.

W. G. Young, Esq. C. S.

Babu Kalichurn Roy.

Captain C. B. Young, Beng. Eng.

His highness Muhammed Hossain Ali, Ex-Amir of Scinde was named for ballot at the next meeting, proposed by Sir James Colville, and seconded by Mr. Grote.

Read a letter from Dr. Clarke expressing his wish to withdraw from the Society.

Mr. Houstoun gave notice of his intention to make the following motions and enquiries at the next meeting, viz.

1. To have laid before the meeting all notes or comments relating to the introduction or cancelment of any introduction to No. 80 of the Bibliotheca Indica.

2. To request that Mr. H. V. Bayley, be requested to accept the Joint-Secretaryship of the Asiatic Society.

3. To know what communications are, as a matter of course, and in what stage, to be laid before the Society, and for what communications the Society must depend upon the Council.

4. To know by whose advice and authority the niche has been made in the Society's meeting room, to the obstruction of a proper circulation of air.

Communications were received—

1. From the Government of India, enclosing extract from a despatch by the Hon'ble the Court of Directors, together with observations by Dr. Royle, on the Graphite or Plumbago of Kumaon and Travancore.

2. From Dr. J. Fayrer, Lucknow, Meteorological Registers kept at the Lucknow Residency for the month of August to December, 1854.

3. From Bábu Rádhánáth Síkdár, abstracts of the results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of November, 1854.

4. From Rájá Rádhákánth Deb, communicating his thanks to the Society for having been elected an Honorary member.

5. From Dr. Campbell, a note on the Limboo alphabet, by Captain Mainwaring.

6. From Lieut. F. Burton, in command of the Somali expedition, announcing despatch of some specimens collected by Lieut. Speke, 46 B. N. I., and enclosing a descriptive list of the fauna of the Somali country.

The following is an extract from Lieut. Burton's letter which is addressed to Mr. Blyth, the Curator of the Zoological Department of the Museum.

"On the 18th October, 1854, Lieut. Speke, by my direction, landed at 'Goree Bunder' (as our maps call it) in the country of the Warsangeli, a large sub-family of the Somali nation. After much trouble and detention on the coast—carriage being with great difficulty purchasable in that part of Eastern Africa—Lieut. Speke started inland towards the Wady Nogal.

"The country traversed by Lieut. Speke along the coast was a tract of sand and limestone, thinly overgrown with jungle. Water was scarce, only one well of pure water being found. Animals did not abound, a few hyænas, and jackals, gazelles, the gúrnuak (gunnouk) antelope, and a little land antelope were discovered. Besides gulls, there were very few birds.

"The distance across the plain from the sea to the mountains, varies from half a mile to two miles. On the 18th November, Lieut. Speke ascended the hills by the bed of a mountain-stream, the only 'Pass' known

in these wild countries, and on the 21st he reached an encamping ground called Adda near the top of the mountain. Here his thermometer (which at the level of the sea boiled at 214°) boiled at $204^{\circ} 15'$, shewing an altitude of about 5,500 feet. The highest point reached is denoted by $200^{\circ} 15'$. These mountains are covered with a thin scrub of acacia in the lower folds. The upper summits are thickly clad with jungle, amongst which grow trees, and a kind of pine called by the Arabs سنوبر (sinanbar), and by the Somalies ديب (dazzib) were conspicuous: Lieut. Speke recognized this tree as familiar to him during his Himalayan wanderings. This vegetation however is confined to the northern or seaward face of the mountains: the southern slopes are bleak and bare. The beasts are rhinoceros (single-horned), a large deer called 'godii,' gazelles, the 'alakud' antelope, a few leopards, which the Somalies fear greatly, and hyenas (none of which were seen). The birds were chiefly hill rock-pigeon and a description of brown partridge. These hills are covered with fossil shells, denoting a lime-stone formation.

"On the 4th December, Lieut. Speke began to descend the southern slope of the mountains which fall about 2,500 feet, the thermometer boiling at $205^{\circ} 30'$. This is the undulating plateau 'above the ghats' which forms the country of the Somalies, Lieut. Speke believes the slope to be from north-west to south-east, and doubts any depression towards the Wady Nogal or due south. The southern side of the mountain drops in steps or terraces, and was then almost devoid of verdure. Water was scarce and brackish: a few superficial springs are scattered about the country, and the depth of the wells or rather the holes in which water is found, is sometimes as great as 60 feet.

"Arrived at 'Rhat,' the most favoured spot in the Warsangeli country, Lieut. Speke found the Kraals of the Nomades numerous, and some interesting ruins said by the people to be of Christian origin. Thence the traveller turned westward and being prevented by the unsettled state of the country and the drought, which at this season is always a formidable obstacle in the eastern parts of Africa, he returned to 'Goree Bunder' and thence embarked for Aden.

"The collection of specimens made by Lieut. Speke embraces the different varieties common to the maritime plain, the ghats, and the plateau above the mountains. A few sparse notes and notices of the habits and habitat of the animals, together with their Somali names, may perhaps be interesting and assist so distinguished a naturalist as yourself in preparing an account of them for publication. May I be allowed to mention that Lieut. Speke has been himself most zealous in collecting and preparing skins, even under the most adverse circumstances, and that during

our future wanderings we shall have (it is expected) greater opportunities of labour in the field of investigation."

7th. From Mr. Secretary Beadon, forwarding a Report (by Mr. Marcadieu) on the ferruginous resources of Kooloo, together with some specimens.

8th. From H. Piddington, Esq. submitting the following papers.

1. A Report on the Cherrapunji Coal.
2. A ditto on the Coal from Talcheer in Cuttack.
3. A ditto on the Kunkurs and Iron stones of Burdwan.

9th. From Dr. Sprenger suggestions and observations for the improvement of the Bibliotheca Indica.

The Curators of the Museum and the Librarian submitted their reports of additions made to their Departments during the month of March last.

Report of the Curator, Museum of Economic Geology, March, 1855.

GEOLOGY AND MINERALOGY.—We have received from Dr. Campbell, Resident of Darjeeling, a series of 34 specimens of rocks collected by that gentleman near the Cholamoo lake in Thibet, on his mission to that country in October, 1849.

It will be recollected that Captain Sherwill in sending us a specimen of the meteorite which fell at Segowlee, mentioned in my last Report, said that he had obtained it from Mr. Glover of the C. S. who had a larger fragment. Learning from him that that gentleman was in Calcutta, I called upon him and he was good enough to promise me another piece for the Society. This fine specimen is now on the table and on comparison with the Allahabad meteorite, it will be seen that they much resemble each other as to their earthy matrix. The Segowlee specimen however, containing numerous white grains (probably sulphuret of nickel) while the Allahabad stone contains evidently fragments of meteoric Iron imbedded.

ECONOMIC GEOLOGY.—I have put into the form of a paper for the Journal my examination of a specimen of Coal from Cherrapunji from a new mine opened by Mr. Inglis and forwarded to us by Messrs. Gilmore and McKilligan, which is not only a first rate gas Coal, but has disclosed some remarkable peculiarities in its coking, which for the present, are very unaccountable.

I have also put into another short paper my examinations of some of the Burdwan Kunkurs, with reference to their applicability as a flux in

the smelting of the iron ores of that district, as shewn by Mr. Taylor of Toposi Colliery in his specimen of iron smeltings.

Mr. Pontet has sent me a specimen of a supposed copper ore from the Railroad cuttings in the Damun-i-koh, but it is nothing more than a red and green Jasper with specks of arsenical pyrites (mispickel) which give in some places a bright metallic streak resembling silver.

Dr. Campbell has forwarded specimens from the further working of the Pushak copper ores already alluded to in my Reports and in the paper on them vol. xxiii. p. 477 of the Society's Journal requesting an opinion as to whether there was any improvement. The only one, which appears evident is that the matrix is somewhat softer.

From E. A. Samuells, Esq. C. S. Commissioner of Cuttack, I have received a letter which gives the following account of his visit to the Coal fields of Talcheer on the Brahminee river.

"I returned from the jungles yesterday and hope by to-day's dak-banghy to send you my first specimens of Coal, iron, iron-stone, &c. The number of the Journal containing Kittoe's researches has never reached me, and I do not know therefore whether I can communicate any thing to the Society with regard to the Talcheer and Ungool coal beds with which they are not already familiar; I may mention shortly to you the route which I took and which will enable you to judge. From Cuttack I proceeded through Dhemkond to Balpore on the Brahminee; there I was told that coal existed in the neighbourhood and sending off a party of workmen in advance, I started after breakfast for the locality, a village called Kangriapara about three miles from Balpore, but when we got near the place we were met by the ominous announcement that the coal was so hard it had turned the points of all the crowbars, and that no one could make any impression on it. On arriving at the spot, the mystery was explained. The supposed coal was a large mass of quartzose rock (No. 7 of the specimens) which thrust its surface blackened by the forest fires which annually swept over it to a height of 20 or 30 feet above the surrounding soil. It was so hard, that I broke my hammer in securing a specimen. At Kumlong about 25 miles further up the Brahminee, I found drift coal in the river opposite the mouth of a nullah called the Nunderajore and immediately below a singular barrier of rock called Jetea Ghatee which is here thrown across the bed of the river. There was no coal in the environs of this barrier or above it, so that I concluded the coal must have been brought down the Nundera, but I could not hear of any coal in that direction; cliffs of a clayey slate are common along the upper part of the stream which I afterwards crossed, but every one assur-

ed me that coal was unknown. I was particularly anxious to discover where this coal came from, because we tried it in camp and found it remarkably good; unfortunately relying upon procuring more next day, in which I failed, we burnt all that I had picked up. The coal bed I explored near the Talcheer Raja's, was the same which Messrs. Beetson and Kittoe had examined at different times. It is situated in the bed of the Bilyejore at the village of Moalpal about two miles above the Raja's residence, a coarse sand stone is the prevailing stone throughout the neighbourhood. The spot where Messrs. Beetson and Kittoe had dug, was pointed out to me, but I preferred breaking new ground and choosing a spot several hundred yards further up, I dug down from the top of the bank, some 12 or 14 feet high, upon the bed. We found first about a foot of peaty substance-like coal, but so soft that you could thrust a stick through it, then coal shale below, which was indifferent coal much mixed up with shale; about 8 or 10 inches below which was a hard slaty rock. The whole bed 5 or 6 feet in thickness, I left a man to bore through the slate and he came to a few inches of coal (specimen No. 10), and below that slate again. The coal is visible on the left hand bank of the nullah for about half a mile, and it might be worth while to sink a shaft at some little distance back from the nullah, when better coal than that obtainable so close to the water, might be procured. If coal exists here of good quality, it would pay well to work it, as there is water carriage down the Brahminee to Point Palmyras; and the Dhamrah river, if the outer channel is properly buoyed off, is accessible to steamers and vessels of 500 or 600 tons. Gopalpersad is from 16 to 20 miles inland from Talcheer, that is inland from the Brahminee river. It stands on a wide torrent, called the Sengra which never has much water, and is usually dry. For several miles above Gopalpersad and about a mile below it the right bank presents a succession of stratified coal cliffs, which have an exceedingly curious appearance; the jungle in rear of these cliffs in many places, presents the appearance of a coal-field such as one is accustomed to see in Durham or Northumberland the whole ground being covered for considerable distances with coal shale and dust. I saw Beetson and Kittoe's excavations, but dug further back and deeper than either of them. The appearance of the coal about six feet back from the river and two or three feet below its bed was excellent; hard, sparkling and much less laminated than the more exposed coal on the cliffs. I marked out a place in the jungle also about 100 yards from the river above the village, when I ordered a pit to be sunk, but going away myself to the village of Kunkerei to see the iron works there, the coolies, to save themselves trouble, commenced on one of

the cliffs close by, and it was not until I was on the eve of departure, that I discovered the mistake. I send you specimens of this coal, and will write you officially regarding it. It will depend on your report whether I send up any large quantity to Calcutta for trial or not. The iron, I send, is from Kunkerei, a village in Ungool, close to the very extensive coal field of Gopalpersad. I have had sketches made by a friend of their process, and also of the Gopalpersad coal cliffs, which I will send you by and bye, the process is most primitive, but the iron bears a high character, 18 seers of the impure iron as I send it you, are sold at the furnace for one rupee; when freed from impurities and well hammered it fetches in the Cuttack bazar, a rupee for 8 seers. The axes and chisels made of it in Cuttack are excellent, *no flur whatsoever is used*. The charcoal is made from the Sal (*Shorea robusta*) I brought a large package of it with me; but my idiot of a bearer choose to think it was of no use and threw it away or cooked his dinner with it. I send you a good deal of slag which I picked up about the forge, I have plenty more if you require it. I had no time to go to the gold regions in Paldeyra; as it is I start again on the 16th for Bood, and shall not be under cover I fancy before May."

The specimens and sketch alluded to, have also reached and are upon the table, and I have examined the coal of which also a detailed report is drawn up for the Journal: the iron ores I have not yet had time to examine.

From Lieut. W. D. Short, Executive Engineer, Midnapore, I received a minute portion of gold dust and gold sands with a request that I would examine them. The following is an extract of my letter to him from which it will be seen that there exists in the gold sands of that district something which would resemble a new mineral, but with such excessively minute specimens nothing very positive can be announced.

"First your gold *dust* contained minute bits of copper, no doubt adulterations? unless you saw them washed out before you in which case they must be native copper?

"Then, in the gold dust and in the washed sand, I found some very minute (pin's head) particles of a mineral which was yellow-white, malleable, and tough; would not amalgamate with mercury! and was excessively difficult of solution in boiling Aqua regia!! though it certainly contained gold!!! What else I was unable to determine, but am inclined to think it may be a sulphuret of gold, a mineral not yet found to exist though gold is found in iron pyrites (sulphuret of iron) where it is therefore *supposed* to exist as a sulphuret.

"All this upon minute pin's-head bits (three of them I think) in watch-glasses, and results watched by a magnifier; so we can say nothing more

positive than as above. I could only trace in the whole of the solutions a doubtful trace of platinum; none of palladium or rhodium.

"But I have now to request that you will, if possible, obtain for me, say at least a quarter of an oz. of the gold dust *from the same locality*, and a quarter of a lb. of the washed sand, the cost of which I shall be glad to pay as you may direct, if you cannot put it into a contingent bill; but if possible I should be glad that it should be washed out before a confidential person, should you not be able to attend to it yourself. Mr. Samuells informs me that the gold-washers thereabouts do not use mercury as they do in the N. W. Provinces. I despatch however to you, per dawk, a pamphlet on the method of saving the greater part of the mercury, but if this new compound exists in any quantity that may be the reason why they do not use mercury. The Burmese are said to throw away the platinum, calling it Devil's metal, i. e. because they can do nothing with it. Do your washers know any thing of any *Shaitan Ka gotee* in their products?"

From Dr. Campbell of Darjeeling we have received two specimens of Copper Ore, being one from his farther diggings at Pushak, an ore already examined as above and another from a new locality called Mahaldiram.

My reply to his letters, is as follows:

A. CAMPBELL, Esq. *Darjeeling*.

SIR,—I have, as you requested, examined the specimens from the farther workings of the Pushak Copper Vein, and I think (differing herein from you,) that there is an evident improvement though not in the ore, yet in the matrix which seems much softer, and I have moreover picked from amongst the specimens two or three small fragments approaching to the pavonine or peacock ore of the Cornish miners which is much richer in copper than the common pyrites. If you reach a vein or bed of this, you may probably find something well worth your search.

The Mahaldiram specimens are, as to abundance, a much more promising ore; though as with the former Pushak, its matrix is tough and in some parts siliceous, but there are good sized lumps of massive ore which make it altogether a far better vein to work at present, than the Pushak, supposing both to be of pyrites only.

I must not, however, forbear to repeat to you that surface indications are next to worthless, till a shaft of some depth has been sunk. I should sink as deep, or drive a gallery as far, as the workmen will go; for these poor ores often overlies much richer deposits of copper; and in America even of silver!

Museum, 19th Jan., 1855.

H. PIDDINGTON,
Cur. Mus. Eco. Geology.

From a friend in China Lt. Conover U. S. Store ship *Supply*, I have received a specimen of Coal from Japan, and one from Killow in Formosa, both of which are good looking Coal. We had no Coal from the Eastward farther than from China hitherto in the Museum, so that these specimens are great prizes.

We have received an imperfect crystal of native sulphur from Persia, presented by Mr. J. B. Lawson.

We have also received from Mr. Pontet, a fine specimen of Umber. The locality is not stated in that gentleman's letter, which he dates only from the "Jungles," but which I suppose to be situated in the Damun-i-Koh. He says it is embedded in the hill side at about 1000 feet elevation, and that there is evidently a very large vein (bed) of it; what is exposed may be five feet thick.

Report of Curator, Zoological Department, for April Meeting, 1855.

I have now the pleasure to acknowledge and report upon a fine collection of skins received from Dr. E. Rüppell of Frankfurt: a collection which has afforded the long sought opportunity of actually comparing sundry Indian and E. African birds together; and the results of such comparison I proceed to lay before the Society, while I distinguish the numerous species which are new to its museum by prefixing an asterisk to each name.

MAMMALIA.

**CERCOPITHECUS ENGYTHITHIA*, (Herm., apud Gray; *C. griseo-viridis*, Desm.; &c.) Abyssinia.

**CANIS VARIEGATUS*, Rüppell. Abyssinia. (Skull wanting.)

**VULPES VIRGINIANUS*, (Gmelin: *V. cinereo-argentatus*, Richardson). N. America.

**SCIURUS MULTICOLOR*, Rüppell (*Sc. cepate*, A. Smith). Abyssinia. (Skull wanting.)

**XERUS SETOSUS*, (Forster; *Macroxus leuco-umbrinus*, Rüppell; &c). Abyssinia.

**PSAMMOMYS OBESUS*, Rüppell. Egypt.

**FIBEX ZIBETHICUS*, (L.) N. America.

**POTAMOCHÆRUS AFRICANUS*, (Schreber; *Sus chæropotamus*, Desmoulin; *S. larvatus*, F. Cuvier). Skin, without skull. From S. Africa.

**COASSUS NEMORIVAGUS*, (F. Cuv.; *Cervus simplicicornis*, Illiger). Doe, from S. America. (Skull wanting.)

AVES.

**PROCEPHALUS MEYERI*, (Rüppell). Abyssinia.

**AGAPORNIS TARANTA*, (Stanley). Abyssinia.

*CIRCUS BANTIVORUS, (Daud.) Africa. Two specimens.

*SPIZARTUS OCCIPITALIS, (Daud.) Abyssinia.

*AQUILA NÆVIODES, (Cuv.; *Falco senegalus*, Cuv.; *F. rapax*, Temminck; *F. albicans*, Rüppell; *Aq. choka*, A. Smith). Abyssinia. This African bird is considered by Mr. G. R. Gray to be identical with the Indian *AQ. FULVESCENS*, Gray (v. *Aq. fusca* et *Aq. punctata*, Gray, et *Aq. vindhiana*, Franklin). The specimen sent by Dr. Rüppell has much larger and more powerful legs and talons, and is altogether a stouter and stronger bird, than its Indian near affine; for which reason we consider it to be a distinct species.*

*HALIAETUS LEUCOCEPHALUS, (L.), in immature plumage. N. America.

MILVUS EGYPTIUS, (Gm.: *Falco Forskalii*, Gmelin; *F. parasitus*, Daud.; *F. parasiticus*, Latham). Egypt. Identical with a specimen from S. Africa, presented by Capt. Sherwill; and readily distinguished from the other dark-coloured Kites by its yellow beak.

*POLYBORUS BRASILIENSIS, (Gmelin). Chili.

*GYPS RUPPELLI, C. L. Bonaparte. (*G. Kolbei* apud Rüppell). Fine adult, from Abyssinia. Upon a former occasion (*J. A. S. XIX*, 502), we called attention to the great difference of opinion among the best ornithologists regarding the specific unity or distinctness of various races of Vulture, which have been comprehended under *G. FULVUS*, (L.) About the same time, the Prince of Canino published his matured opinion on the subject, in the *Rev. Zool. &c.*, 1850, p. 447; and we feel satisfied of the correctness of his views. His highness recognises,—1, *G. FULVUS*, (L.), of Europe (and we may add the high mountains of Asia, as the Himalaya).†—2, *G. OCCIDENTALIS*, Schlegel (v. *Kolbei* apud Temminck, *Man. d' Orn.* IV, 587), of the Pyrenees, Sardinia, and the Barbary States.—3, *G. RUPPELLI*, Schlegel (*vulgaris?* C. L. Bonap., *ibid.* p. 242, v. *Kolbei* apud Rüppell), of E. Africa.—4, *G. KOLBEI*, (Daudin), founded on the S. African *Chasse-fiente* of Levaillant.—5, *G. INDICUS*, (Scopoli, v. *tenuiceps* and *tenuirostris*, Hodgson), of India and the Malay countries. And 6, *G. BENGALENSIS*, Gmelin, of India (and also E. Africa, according to Rüppell). Our museum now possesses the whole of these, with the exception of *G. KOLBEI* of S. Africa: and there can be no doubt of the distinctness of the others. With the exception of *G. BENGALENSIS*, all are very remarkable for possessing 14 rectrices.‡

* We also exceedingly doubt the alleged identity of the Indian *BUTEO CANESCENS* with the Nubian *B. RUFINUS*.

† In Macedonia, this species was noticed by Capt. Drummond to be "most numerous in the plains as well as the mountains." *Ann. Mag. N. H.* XVIII, 10.

‡ In *G. FULVUS* (*verus*), which is the 'great White Vulture' of the Himalaya,

**NEOPHRON PILEATUS*, (Burchell; *N. carunculatus*, A. Smith; *Pernopterus niger*, Lesson; *Cathartes monachus*, Temminck). Abyssinia.

**CATHARTES AURA*, (L.) Chili.

BUBO VIRGINIANUS, (L.) N. America.

**PROMEROPS CYANOMELAS*, Cuvier. Abyssinia.

HALCYON SENEGALENSIS, (L.) Nubia.

**MEROPS CÆRULOCEPHALUS*, Latham. Abyssinia.

**M. LAMARCKI*, Cuvier (*M. viridis* apud Rüppell). Two specimens, from Abyssinia. This differs from the Indian *M. VIRIDIS*, L., in having much more ferruginous on the wings, extending across both webs of the primaries and secondaries; and the throat is yellowish-green, tinged with ferruginous, having scarcely a trace of verditer except on its extreme

the clothing plumes generally are elongated and lanceolate at all ages; and those covering the craw are pale or whitish. It is also a larger bird than the others; the closed wing of a young Nepalese specimen measuring 33 inches.

In a fine adult of *G. OCCIDENTALIS*, from Algeria, the closed wing measures but 27 inches. The clothing feathers are much less acuminate than in *G. FULVUS*, and resemble those of *G. RUPPELLI* in form; but their colour is throughout dull pale isabelline, slightly tinged with ashy excepting round the margins; and the hue of those covering the craw is much darker.

In the adult *G. RUPPELLI*, the whole plumage is fuscous, with strongly contrasting whitish margins more or less broad, imparting a handsome variegated appearance, especially to the scapularies and coverts of the wings and tail: feathers covering the craw blackish; and those forming the white ruff shorter and more dense than in either of the preceding. Length of wing 24 inches.

As we have all ages of the affined *G. INDICUS* for reference, we observe that its feathers are not more or less acuminate according to age; and in the young of this species and of *G. FULVUS* (and doubtless of the others also), the feathers of the upper-parts have a medial pale streak, but not the broad whitish margins which distinguish the adults of *G. RUPPELLI*.

In *G. RUPPELLI*, the beak is somewhat broader in proportion to its length than in *G. FULVUS* and *G. OCCIDENTALIS*, resembling that of *G. BENGALENSIS* except in having its ceral portion more prolonged backwards; while *G. INDICUS* has a comparatively slender bill, especially as viewed laterally, with its ceral portion remarkably elongated. In a particularly fine adult of *G. INDICUS*, the closed wing measures 24½ in.

Good Himálayan specimens (skins) of the adult and young of *G. FULVUS*, with skeleton; and skeleton also of *VULTUR MONACHUS*, the 'Great Black Vulture' of the Himálaya; and of the *GYFAËTOS*, popularly mis-called 'Golden Eagle' by English residents;—would be very thankfully received for the Society's museum.

lateral margin bordering the black eye-streak, and very little of it even there.

DENDROBATES GOËRTAN, (Gm. ; *D. poiocephalus*, Swainson). Two specimens, from Nubia.

*CAMPETHERA NUBICA, (Boddäert); *Picus punctatus*, Cuv. ; *P. notatus*, Lichtenstein. S. Africa.

*C. ÆTHIOPICA, (Hemprich). Two specimens, from Abyssinia.

*LÆMODON BRUCEI, Rüppell. Abyssinia.

*L. UNDATUS, Rüppell. Abyssinia.

*L. MELANOCEPHALUS, Rüppell. Abyssinia.

*BARBATULA CHEYSOCOMA, (Temminck). Abyssinia.

*TRACHYPHONUS MARGARITATUS, Rüppell. Abyssinia.

*TURACUS LEUCOTIS, Rüppell. Abyssinia.

COLIUS SENEGALENSIS, L. Abyssinia.

*C. LEUCOTIS, Rüppell. Two specimens, from Abyssinia.

*OXYLOPHUS AFER, (Leach, = *Levaillantii*, Swainson, and *ater* apud Rüppell; nec *ater*, Gmelin, which = *SERRATUS*, Sparrman, a common Cape species, which the late H. E. Strickland received from Kordofan).* Specimen from Abyssinia. Throat and fore-neck black, the feathers laterally edged with dull white, which gradually increases downward; the black predominating much more than as represented in Swainson's figure (*Zool. Ill.*, 2nd series, Vol. I, pl. 13), and spreading downward over the breast and flanks.

*CENTROPUS SUPERCILIOSUS, Rüppell. Abyssinia.

*CAPEIMULGUS ISABELLINUS, Temminck. Ditto.

*CORVULUS CRASSIROSTRIS, Rüppell. Ditto.

*CORVUS PHŒOCEPHALUS, Cabanis. (*C. scapulatus* apud Rüppell.†) Ditto.

*LAMPROTORNIS CYANIVENTRIS, nobis, n. s. : *L. nitens* apud Rüppell, from Abyssinia; nec *NITENS* (L.), of S. Africa, from which it differs in having a conspicuously shorter bill, and in various details of colouring. In *L. NITENS* (*verus*), the whole plumage is glossy *æneous* or steel-green, brightest on the wings, and mingled with steel-blue on the head and neck; the abdominal region being of the same hue as the back, but an admixture of steel-blue is observable on the tibial plumes, axillaries, and

* Vide P. Z. S. Nov. 26, 1850.

† Vide the Prince of Canino, in the *Comptes Rendus*, tom. xxxvii (1853), p. 829. This Abyssinian specimen, however, accords precisely (even in measurements) with Swainson's description of *C. CURVIROSTRIS*,—? (nec Daudin, v. *leuconotus*, Sw.), of W. Africa, which is stated to be distinct from the nearly affined *C. SCAPULATUS*, Daudin, of the Cape; while another, of similar colouring, will stand as *C. MADAGASCARIENSIS*, C. L. Bonaparte.

under wing-coverts: shoulder of the wing (under the scapularies) bright steel-blue or purple, tipped with amethystine, which forms a distinct bar. In *L. CYANIVENTRIS* the upper-parts are glossy steel-green, uniform on the crown, nape, and back, but passing to bluish on the rump and upper tail-coverts, and also on the ear-coverts; throat and breast like the back, but the belly and thighs are brilliant steel-blue mixed with amethyst; as likewise the axillaries and under wing-coverts, which are very brilliant, the amethystine hue prevailing: shoulder of the wing (under the scapularies) steel-blue, with no terminal amethystine bar as in *L. NITENS*, but a little of this colour shewing at the bases of the feathers. In *L. CYANIVENTRIS*, the wings are more uniformly glossed than in *L. NITENS*, extending quite over the tertiaries and primaries; and the wing-coverts and tertiaries have their black terminal spots larger and rounder. In fact, the northern bird approaches in brilliancy to the superb *L. SPLENDENS*, (Leach, v. *L. ptilinorkhynchus*, Swainson,) of W. Africa, of which also we possess a fine specimen.

**JUIDA EUVIVENTRIS*, (Rüppell). Abyssinia. This form approximates the Malayan genus *CALOENIS*, G. R. Gray; but the feathers are throughout rounded or not acuminate,

**HYPHANTORNIS AURIFRONS*, (Temminck). Male and female. S. Africa.

**PLOCEUS* ———? Male. S. Africa.

**PL. LABVATUS*, Rüppell. M. and F. Abyssinia.

**EUPLECTES XANTHOMELAS*, Rüppell. M. and F. Ditto.

**EU. FLAVESCENS*, (Daud.; *Fringilla phalerata*, Illiger). S. Africa.

**EU. FLAMMICEPS*, Swainson. M. and F. Abyssinia.

**COLIUSPASSER TORQUATUS*, Rüppell. (*Vidua rubritorques*? Swainson). M. and F. Abyssinia.

**VIDUA PARADISEA*, (L.) Two females. Abyssinia.

**V. SERENA*, (L.; *V. erythrorhyncha*, Swainson). Abyssinia.

**AMADINA* (?) *FRONTALIS*, (Vieillot). Abyssinia.

**MUNIA CANTANS*, (L.) Two specimens, from Abyssinia. Affined to the Indian *M. MALABARICA* (v. *Lonchura chest*, Sykes).

**ESTRELLA ELEGANS*, (Vieillot; subg. *Pytilia*, Swainson). Abyssinia.

**E. BENGALUS*, (L.) Abyssinia.

**E. CINEREA*, (Vieillot). Abyssinia.

**PASSER SIMPLEX*, (Lichtenstein; *P. Swainsonii*, Rüppell: nec *P. simplex* apud Swainson, which = *P. GULARIS*, Lesson). Abyssinia.

**P. SALICICOLUS*, (Vieillot; *P. hispaniolensis*, Tem.) Female, from Egypt. This species was observed in Afghanistan by Capt. Thos. Hutton, and is not uncommon at Peshawur. In Kohat it abounds, and is there known as the 'Kábul Sparrow.' (Lt. Alex. J. Trotter, in *epistola*.)

**EMBERIZA SEPTENTRIONATA*, Rüppell. Abyssinia.

**SERINUS* (?) *STRIOLATUS* (*Pyrrhula striolata*, Rüppell). Female, from Abyssinia. This bird combines the beak of a *CARPODACUS*, with the plumage of a Serin, *CEITHAGRA*, or Siskin. The species of the true Canary-bird type, or *CEITHAGRA* of Swainson, Dr. Rüppell refers to *SERINUS*.*

**CEITHAGRA NIGRICEPS* (*Serinus nigriceps*, Rüppell). Two males. Abyssinia.

**CR. XANTHOPYGIA* (*Serinus xanthopygius*, Rüppell). Abyssinia.

* His *S. TRISTRIATUS*, however, we consider to be a *PASSER*; and may here add, that the *S. aurifrons*, nobis, *Catal.* No. 681, proves to be identical with *Passer pusillus*, Pallas, and will now stand as *SERINUS PUSILLUS*. We have not the European Serin (*S. MERIDIONALIS*, C. L. Bonap.), for comparison; but M. de Selys Longchamps informs us that the beak of *S. PUSILLUS* resembles that of *S. MERIDIONALIS* when viewed laterally, but is a little less bulged, as seen from above. The beak of *S. (?) STRIOLATUS* is probably even more bulged, as viewed from above, than that of *S. MERIDIONALIS*; but we suspect that *SERINUS* (as founded on the European bird, *Fringilla serinus*, L.), is the modern genus or sub-genus with which it best accords.

S. PUSILLUS has hitherto been only known to inhabit the high mountains of W. Asia; and according to Pallas is common upon the Caucasus and about the Caspian sea. In summer it is found near the snow-line, together with *MONTIFRINGILLA NIVALIS* and *RUTICILLA ERYTHROGASTRA*; descending in winter to the sub-alpine regions of Persia. *S. MERIDIONALIS* is "common in Asia Minor, visiting the plains in flocks during the winter." (Strickland).

Our specimens of *S. PUSILLUS* were procured by Capt. T. Hutton and by L. C. Stewart, Esq., in the vicinity of Masuri, in different winters; and Capt. Hutton lately informed us, that he had "fallen in with it this winter (1854-5), after an interval of many years. It appeared to be always in pairs, and like our Siskin and Goldfinch is very fond of alighting upon the tall coarse nettles which abound here. They are merely winter birds at Masuri, and seem to have left about the middle of February." In summer, we are informed by Lt. Speke, of the 46th B. N. I., that "it is found in Spiti and Ladakh at an altitude of from 10 to 13,000 ft., but not in such quantities as *PYRRHOSPIZA PUNICEA*; more than 2 or 3 being seldom seen at a time; and like the Goldfinch they are not confined to a distinct locality."

So far as we can remember, the genus *PYRRHULOIDES*, nobis, *J. A. S.* XIII, 951, founded on *PYRRHULA EPAULETTA*, Hodgson, *As. Res.* XIX, 156, is nearly affined to *SERINUS*, and intermediate to that genus and true *PYRRHULA*. (*S. PUSILLUS* is the type of the division *METAFONIA*, C. L. Bonap., *Comptes Rendus*, XXXVII (1853), p. 917).

CALANDRELLA BRACHYDACTYLA, (Tem.) Two specimens, from Abyssinia. Head less rufescent, and with the dusky mesial streaks to the feathers more developed, than we remember to have seen in Indian specimens: but an example from Algeria differs in no respect from the latter.*

**ALAUDA RUFICEPS*, Rüppell. Two specimens, from Abyssinia.†

AGRODROMA SORDIDA (*Anthus sordidus*, Rüppell). Before receiving this Abyssinian specimen, we had provisionally identified the large dull sandy-coloured Pipit of the Panjáb, previously referred to *A. SIMILIS*, Jerdon, with the present species: and we feel little doubt that *A. SIMILIS* of the Indian peninsula will prove to be identical with *ANTHUS CINNAMOMEUS* of Rüppell. The S. Indian bird is very remarkable, among the *MOTACILLIDÆ*, for possessing an extremely rudimentary first primary.

* The Prince of Canino, enumerating the species of this genus, gives one as *C. BAGUEIRA*; by which we presume that the Indian bird is intended. *Comptes Rendus*, XXXVIII (1854), p. .

† Dr. Rüppell refers this bird to *MEGALOPHONUS*, G. R. Gray; but the characters are rather those of the true *ALAUDÆ*, except that the legs and feet are comparatively small and weak. The wing has the short first primary minute, the third, fourth, and fifth equal and longest, and the second and sixth are scarcely shorter. *A. ERYTHROPYGIA*, Strickland, from Kordofan (*P. Z. S.* Nov. 1850), is probably affined to it.

The true *MEGALOPHONI* (v. *Brachonyx*, Swainson,) were classed as *MIRAFRÆ* by Dr. A. Smith; and they seem to be merely weak-billed *MIRAFRÆ*, and resemble *MIRAFRA* in wanting the tuft of short bristly feathers over each nostril, which is characteristic of the more typical Larks. *CERTHILAUDA* also wants this tuft, and *MACRONYX* (but the latter is a genus of *Pipits*, affined to the long-clawed *CORYDALLÆ*, as *C. RICHARDI* and *C. RUFULA*). Mr. G. R. Gray assigns to *MEGALOPHONUS* certain true Larks (possessing the nareal tuft) of S. Africa, which Dr. A. Smith classed as *ALAUDÆ*; but these constitute a peculiar form, *CALENDULAUDA*, nobis; ex. *ALAUDA ALBESCENS*, Lafr. (v. *A. codea*, A. Smith),—*A. LAGEPA*, A. Smith, &c.

The genus *MIRAFRA*, also, has hitherto been composed very heterogeneously. Confining it to the species devoid of nareal tufts, we therefore distinguish, 1, *SPIZALAUDA*, nobis; ex. *M. HAVI*, Jerdon, which is a peculiar and rather thick-billed true Lark, as shewn by the form of the wing, &c.; and 2, *ANNOMANES*, Cabanis; ex. *M. PHENICURA*, Franklin,—*AL. LUSTANIA*, Gmelin (v. *deserti*, Licht., *isabellina*, Tem., et *M. phanicuroides*, nobis),—and probably *M. CORNUFANICA*, Strickland (*P. Z. S.* Nov. 26th, 1850), to which we suspect that *A. cinnamomea*, Bonap. (*Rev. Zool. &c.* 1851, p. 178), should be referred. (P. S. Since this note was first printed, we have learned of the prior establishment of the genus *ANNOMANES*; and that *A. CINNAMOMEA* (*CORNUFANICA*?) is correctly referred to it; also the *ALAUDA FALLIDA* of Ehrenberg, which possibly

BUDYTES VIRIDIS (*Motacilla viridis*, Scopoli, founded on the bad figure in Brown's *Ill. Orn.* pl. 33, f. 2; *M. bistrigata*, Raffles; *B. melanocephala* et *B. beema*, Sykes; *B. neglecta*, *melanocephala*, et *flava*, apud Jerdon, *Catal.*; *M. melanocephala*, Lichtenstein; *B. flava* vel *neglecta* et *B. Rayi* vel *flaveola* of India and the Malay countries, *auctorum*). Two specimens, from Abyssinia.

**CRATEROPUS LEUCOPYGIUS*, Rüppell. Abyssinia.

ERYTHROPYGIA GALACTOTES, (Tem.) Ditto.

**LANIUS COLLARIS*, L. Ditto.

ENNEOCTONUS RUFUS, (Brisson). Ditto.

**LANIABUS ERYTHROPTERUS*, (Shaw). Ditto.

**DRIOSCOPIUS CUBA*, (Latham). Ditto.

**PLATYSTEIRA SENEGALENSIS*, (L.) M. and F. Ditto.

MERULA OLIVACEA, (L.) Ditto.

**THAMNOLÆ SEMIRUFA* (*Thamnobia ? semirufa*, Rüppell.)—Ditto. Altogether distinct from *THAMNOBIA*, which we conceive to be nearly affined to *TROGLODYTES*.

**CERCOTRICHAS ERYTHROPTERUS*, (L.) Ditto. This is a true *Shāma*, and the generic name *CERCOTRICHAS*, Boie, holds precedence of *Kittacincla*, Gould. Our museum now possesses three species,—*C. ERYTHROPTERUS* of Nubia, Abyssinia and Kordofan,—*C. MACROURUS* of India and the Malay countries,—and *C. LUZONIENSIS* (*Copsychus luzoniensis*, Kittlitz), of the Philippines.*

—rather than *LUSITANIA*—may be identical with our *Mirafra phanicuroides*, *passim*: but we have seen no description of *ANN. PALLIDUS*.)

There still remain 6 or 7 species of true *MIRAFRA*,—viz. 4 in India, *M. ASSAMICA*, *M. AFFINIS*, *M. ERYTHROPTERA*, and *M. CANTILLANS*,—a fifth in Java, *M. JAVANICA*,—a sixth in N. S. Wales, *M. HORSFIELDI*, Gould (which is affined to the Indian *M. CANTILLANS*), and Mr. Gould suspects another in N. Australia, larger and more nearly affined to *M. JAVANICA*. *M. ASSAMICA* is erroneously identified with the last-mentioned species by Mr. G. R. Gray.

N. B.—*M. flavicollis*, McClelland (*P. Z. S.* 1839, p. 163), is merely the female of *EMBERIZA AUREOLA*!

* There can be no doubt that *C. MACROURUS* (which is often termed the *Indian Nightingale*) is the species familiarly referred to as "the Nightingale" by Dr. J. D. Hooker, in his '*Himalayan Journal*' (I, 332, II, 146): the season which he states them to be in song (October), quite sufficing to shew that the real Nightingale cannot be intended. The true British Nightingale abounds in Persia, where it is termed *Bulbul-i-hazār-dāstān*, or the "bird with a hundred tongues;" and many caged Nightingales are brought from that country to Afghānistān in the first instance, and thence to India; a few finding their way even to Calcutta, where they command a high price as song-birds, and are known as the *Bulbul bosta*. To the proper *Fauna Indica*, the veritable genus *LUSCINIA* is unknown.

PRATICOLA RUBICOLA, (L.) Abyssinia.

**PR.* (P) *SORDIDA*, (Rüppell). Two specimens. Ditto.

**SAXICOLA ISABELLINA*, Rüppell. Ditto.

S. AURITA, Temminck. Ditto.

**SYLVIA LEUCOPOGON*, Meyer. (*S. passerina*, Temminck; *S. subalpina*, C. L. Bonap.) Egypt.

**SALICARIA* (P) *CINNAMOMEA*, Rüppell. Abyssinia. This curious little bird is apparently congeneric with the *TRIBURA LUTEOVENTRIS*, Hodgson, *P. Z. S.* 1845, p. 30, and *J. A. S.* XIV, 583; but as we have good specimens of neither for comparison, we can only thus indicate the affinity.

PHYLLOSCOPUS BONELLII, (Vieillot; *Sylvia Nattereri*, Temminck).

**TOCHITREA MELANOGASTER*, (Swainson). Abyssinia. In plumage like some specimens of *TCH. AFFINIS*, nobis, but the bill and feet much smaller.

**HIRUNDO RIOCOURII*, Savigny (*H. cahirica*, Licht.; *H. rustica orientalis*, Schlegel). Specimen from Abyssinia, with under-parts not more rufous than in ordinary *H. RUSTICA*, from which it certainly (the present specimen at least) is insufficiently distinguished.

**H. MELANOCRISUS*, Rüppell. Abyssinia.

**H.* (P) *PRISTOPTERA*, Rüppell. A highly interesting and separable form of Swallow, with minute bill and feet, and the outer margin of its first primary having the extremities of the filaments reverted into hooks, as in the N. American *H. SERripENNIS*, Audubon, which however is a *COTILE* (or burrowing bank Swallow).

**ORIOIUS MELOXITTA*, Rüppell. Abyssinia.

**NECTARINIA TAKAZE*, (Stanley). M. and F. Abyssinia.

N. FORMOSA, (L.) M. and F. Ditto.

**N. CRUENTATA*, Rüppell. Ditto.

**N. HABESSINICA*, Ehrenberg. Ditto.

**N. AFFINIS*, Rüppell. Ditto.

**N. METALLICA*, Lichtenstein. Nubia.

**ALSOCOMUS GUINEA*, (L.) Abyssinia.

ALS. ARQUATRIX, (Tem.) Ditto.

**TURTUR ERYTHROPHYS*, Swainson. Two specimens are sent as *T. EISORIUS* apud Rüppell, one from Nubia, the other from Abyssinia. Both differ from the Indian Collared Turtle-dove (*T. EISORIUS verus*), and agree with that of S. Africa (*T. VINACEUS*), in having a much broader black semi-collar upon the nape. Both also are of a much paler hue than the S. African bird, especially on the crown. The Nubian is larger, the wing measuring 7 in. long, with its 1st primary $\frac{3}{8}$ in. shorter than the next, the 2nd and 3rd equal, and the 4th $\frac{1}{2}$ in. longer than the 1st; tail rounded, its outermost feathers $\frac{3}{8}$ in. shorter than the medial. Colour

nearly as in the Indian bird, but the vinaceous hue of the neck and breast more intense; the axillaries, sides, and under surface of the wing, dark ashy, whereas in the Indian bird they are whitish; the tail also is more broadly tipped with white, and its lower coverts are ashy. The feet too are larger and coarser; and bill pale-coloured. This is clearly Mr. Swainson's *T. ERYTHROPEUS*; whereas the Abyssinian species is, as decidedly, the

**T. SEMITORQUATUS*, Swainson (though not well agreeing with Dr. Rüppell's figure of *SEMITORQUATUS*). Wing $6\frac{1}{2}$ in. only; its 1st and 3rd primaries $\frac{1}{2}$ in. shorter than the 2nd, and $\frac{3}{4}$ in. longer than the 4th: tail sub-even, its outermost feather being $\frac{1}{2}$ in. shorter than all the rest. Crown of the same vinaceous hue as the breast, scarcely infuscated, and devoid of ashy tinge; axillaries, sides, and under surface of wings, very pale ashy; and middle of belly and lower tail-coverts white. Bill black; and tarsi and toes conspicuously more slender and less coarse than in the preceding. From the very decidedly distinct form of the wings and tail, we do not hesitate to consider this as a distinct species from its various near congeners.*

* In the Cape species, *T. VINACEUS*, (Gm.), the 2nd and 3rd primaries are equal and longest, and the 1st and 4th are sub-equal, and $\frac{1}{2}$ in. shorter than the preceding: outer tail-feathers $\frac{3}{4}$ in. shorter than the medial. General colour much darker than in the others; the under-surface of wings dusky-ash; but the vent and lower tail-coverts are whitish.

T. NISORIVS of India has the third primary a little shorter than the 2nd, and the 1st $\frac{1}{2}$ in. shorter, and the 4th $\frac{3}{4}$ in. shorter, than the 2nd: tail-feathers sub-even, or slightly rounded, except the outermost pair, which are $\frac{1}{2}$ in. shorter than the medial. Nuchal semi-collar much narrower than in the others, and no vinaceous hue on the nape below it; beneath the wings are whitish; and the vent and lower tail-coverts are of a full ash-grey.

T. BITORQUATUS, (Tem.), of Java, Timor, &c., is another fine species of this immediate sub-group, with the grey of the crown and wings, and the vinaceous of the neck and breast, deeper and brighter than in the others; black semi-collar moderately broad, and margined (more broadly above) with white; beneath the wings very dark ashy; and vent and lower tail-coverts white.

The Indian *T. HUMILIS*, (Tem.), is somewhat less affined to the rest, and is very remarkable (among the *COLUMBIDÆ*) for the diverse hue of the sexes.

Having now five closely affined and very similar wild species or distinct races of Collared Turtle-dove actually before us, the question arises, to which of them should the common domestic Collared Turtle-dove (so abundantly bred in cages) be referred, if indeed to any one of them? This domestic breed would seem to be of exceedingly remote antiquity, and was probably derived by the

T. SENEGALENSIS, (L.: *Col. cambaiensis*, Gmelin; *C. aegyptiaca*? Lath.; *C. maculicollis*? Wagler). Two specimens from Abyssinia differ from all the Indian we have seen, in having the colours distinctly broken on the scapularies, and more or less on the back; the scapularies being of a dull

Hebrews from the Egyptians. The breadth of its black semi-collar points to an African rather than to an Indian origin. There can be little doubt that it is the "Turtle-dove" of our English version of the Pentateuch, repeatedly mentioned as the equivalent of a "young Pigeon" for a burnt-offering,—“a pair of Turtle-doves or two young Pigeons,”—and that it was abundantly propagated in cages as at present, and, therefore, always available. That our Indian *T. risorius* is *not* (as currently supposed) the wild type of this domestic breed is indicated, firstly, by its very different voice or *coo*,—secondly, by its larger size, reversing the usual rule with domestic animals, and with the generality of tame Pigeons in particular, —and thirdly (as remarked before), the domestic Collared Turtle-dove has always a much broader black semi-collar than *T. risorius*, in which it accords with the three wild races found in Africa. Of the latter, the Cape species (*T. VINACEUS*), and equally the Malayan (*T. BITORQUATUS*), may at once be set aside, for geographical reasons alone, besides that there are other objections: and of the two that remain, *T. SEMITORQUATUS* agrees best in size, and also in having white lower tail-coverts; but the tail is more squared, and the feathers composing it are considerably broader, while the black bill seems to be a further objection. Comparison of voice would of course assist the enquiry. To the best of our judgment, not one of the five accords sufficiently; and the genuine wild type may yet remain to be discovered, in another equally affined wild species, of which there may be several yet undesiscriminated. The tame breed is very true to its particular colouring, except when pure white, and the white are often matched with the ordinary blonde or cream-coloured Doves, producing an intermediate or pallid offspring: but the cream-colour has a decided look of domesticity, and is unlikely to have been the original hue. Mr. Selby assures us that “a mixed breed is often obtained between it and the common wild Turtle-dove” of Britain (*T. AURITUS*); “but the progeny are invariably mules and incapable of further increase,—a fact that has been established by many careful and oft-repeated experiments.” *Jardine's Nat. Libr., Columbida*, p. 172. The same experiments might easily be tried with the Indian *T. risorius*; only in this instance the affinity is undoubtedly closer.

(*P. S.*—Since the above was in type, we have seen the Prince of Canino's *Coup d'Œil sur les Pigeons*, published in the '*Comptes Rendus*' for 1854-5, and especially his remarks on the Turtle-doves (1845, pp. 15, 16). The particular subgroup of *T. risorius* and its affines is designated by his Highness STREPTOPELIA; and he refers to it four species from Africa, and five from Asia and its dependencies. The domesticated race is assigned (as currently) to *T. risorius*. To judge from Dr. Rüppell's figure, however, we should have referred the Abyssinian *T. LUGENS* to

fuscescent-brown, with broad ferruginous tips, whereas in the Indian bird the two colours are completely blended, or there is (at most) but a faint indication of the *break*, which must be sought for to be observed. Savigny's coloured figure of the Egyptian bird must either represent a distinct species, or both size and colouring are exceedingly exaggerated.*

**ENA CAPEENSIS*, (Latham). Abyssinia.

PTEROCLES EXUSTUS, (Tem.): female, from Nubia.

**PT. SENEGALENSIS*, Lath. (*Pt. guttatus*, Licht.) Mas. Ditto.

**OLAMATOR* (?) *ERKEHLI*, (Rüppell). Abyssinia.

**GLAREOLA LIMBATA*, Rüppell. Two specimens. Ditto.

**LOBIVANELLUS MELANOCEPHALUS*, Rüppell. Ditto.

**L. SENEGALENSIS*, (L.; *Vanellus lateralis*, A. Smith). Ditto.

SARCIOPHORUS CORONATUS, (L.) Nubia.

* " *PILEATUS*, (L.) Ditto.

* " *MELANOPTERUS*, (Rüppell). Abyssinia.

**METOPIDIVS AFRICANUS*, (L.) Abyssinia.

PHILOMACHUS PUGNAX, (L.) Ditto.

SYMPHROTIDES (?) *VIGORSII*, A. Smith (*O. scolopacea*, Tem.; *O. ruficrista*, A. Smith, *apud nos.*, *Catal.*) S. Africa.

**S. MELANOGASTER*, (Büppell). Female. Abyssinia. Closely affined to the Bengal Floriken (*S. BENGALENSIS*); but shorter in the tarse, with some other distinctions.

S. AFER, (Latham). Two specimens. S. Africa.

**SCOPUS UMBRETTA*, (L.) Abyssinia.†

the group of *Turtures auriti*; and, of this latter group, may remark that *T. RUPICOLA*, (Pallas,) replaces *T. MÆNA* in the Simla and Masuri hills. *T. DUSSUMIERI*, (Tem.), "with broad collar, from Malasia and the Philippines," we have never seen from continental Malasia (*i. e.* the Malayan peninsula); where *T. TIGRINUS* abounds, distinct alike from *T. SURATENSIS* and *T. CHINENSIS*. *STR. GAIMARDI*, C. L. Bonap., "with much narrower collar, and much shorter toes," than *STR. DUSSUMIERI*, is described from the Marianne Islands; and the fifth Asiatic species of *STREPTOPHELIA* is the Indian *HUMILIS*, so remarkable for the diversity of the sexes.)

* The Prince of Canino separates the Indian and N. African races.

† Mr. Frith remarks the affinity of this curious genus for *ANASTOMUS*; still especially the young of the latter. We suspect, from the figures we have seen of that extraordinary and gigantic wader from the White Nile, lately described by Mr. Gould as *BALENCORUS* ~~sp.~~, that this latter bears much the same relationship to *SCOPUS*, that *CANCORUS* does to *ARDEA* and especially *NYCTICORAX*. *Batm.*

**CICONIA ABDIMII*, Licht. (genus *Sphenorhynchus*, Hemprich; *Abdimia*, and the species—*Abd. sphenorhynchos*, C. L. Bonap.) Ditto.

ARDEA PURPUREA, (L.) Two specimens. Ditto.

HERODIAS ASHA, (Sykes; *A. gularis*, Bosc.; *H. pannosa*? Gould). From the Red Sea. We have long suspected the identity of these; and so far as the present specimen enables an opinion to be formed on the subject, our suspicions are confirmed: but it is still desirable to compare adults in breeding livery. (The Prince of Canino admits all three as distinct. *Comptes Rendus*, 1855, p. 720.)

H. BUBULCUS, (Savigny).. Sent as *H. Veranii*, (Roux), from Egypt. This is the third specimen which we have received as *H. Veranii*, the others being respectively from Sicily and Algeria. We cannot perceive in them the slightest difference in size, proportions, or colouring, from the common Buff-backed Egret of India and Java; and, therefore, can only regard them as of one species.

NYCTICORAX GRISEUS, (L.) Adult and young (the latter remarkable for the strong rufous tinge on its great alars and caudals); from Abyssinia.

**FULICA CRISTATA*, L. Two specimens. Ditto.

GALLINULA CHLOROPUS, (L.) Ditto.

• *THALASSEUS BENGALENSIS*, (Lesson): *Sterna media* (?), Horsfield; *St. affinis*, Rüppell; *St. Torresii*, Gould; *Sterna*, Jerdon's *Catal.* No. 402). A species widely diffused over the Indian Ocean, from the shores of India and Africa to those of Papua and Australia. Specimen from the Red Sea; exactly resembling another from the Bay of Bengal: while a third, from Singapore, in winter dress (like that originally described by M. Lesson), exhibits the greater development of black upon the primaries noticed by Dr. Pucheran in *Rev. Zool. &c.* 1850, p. 544.*

STERNA HIRUNDO, L. From the Red Sea. Identical with specimens from Europe and S. India.

**PLECTROPTERUS GAMBENSIS*, (Latham). Abyssinia.

**DENDROCYGNA VIDUATA* apud Rüppell. Young, from Abyssinia. This can hardly be the same species as *D. VIDUATA*, (L., *vera*), from S. Ame-

NICEPS, *SCOPUS*, and *ANASTOMUS* are all African forms, the last having also a peculiar Indian species. (The African species heretofore referred to *ANASTOMUS*—*A. LAMINIGERUS*, Tem.—is the type of *HIATON*, Reichenbach.)

* There can be little doubt also of the identity of *St. velox*, Rüppell, with *TH. CRISTATUS*, (Stephens, nec Swainson, v. *St. ptilonoides*, King); from the Indian Ocean, China, and N. Australia. We have a specimen from the Maldives, and another from the Tenasserim coast.

rica; figured in Griffith's Translation of and Commentary on Cuvier's *Régne Animal*, VIII, 671.

ANAS ERYTHROHYNCHA, (L.) Two specimens. Ditto.

**A. LEUCOSTIGMA*, Rüppell. Ditto.

**A. RUPPELLI*, nobis, n. s. Sent as *A. PÆCILORHYNCHA*, from Central Africa. A smaller bird than *A. PÆCILORHYNCHA* (*vera*, which was originally described from Ceylon), with closed wing measuring $9\frac{1}{2}$ in.: beak to forehead $1\frac{7}{8}$ in.; and tarse $1\frac{1}{2}$ in. Colour nearly as in the common Indian bird, but with the head and neck uniformly streaked; whereas *A. PÆCILORHYNCHA* has the crown and stripe through the eyes dusky, and supercilium and rest of head and neck whitish, with minute dusky specks; wing-speculum much the same; but *A. PÆCILORHYNCHA* has the entire outer web of the larger tertiaries white, while *A. RUPPELLI* has only their extreme outer border white. The rump and upper and lower tail-coverts in *A. PÆCILORHYNCHA* are uniformly dark-coloured, and brightly glossed with green in the male; in *A. RUPPELLI* they are variegated like the back and belly. Lastly, the bill of the latter is more than proportionally smaller, much less gibbous at base, and differently coloured. In *A. PÆCILORHYNCHA* the gibbous triangle on either side of the advanced frontal feathers is of a bright orange-colour; the tip of the bill, with the posterior half of the *dertrum*, intense yellow;* and the rest black: in *A. RUPPELLI* the bill is chiefly yellow, with merely a portion of its upper surface and the *dertrum* black. The legs also appear to be infuscated, instead of bright coral-red as in the other.

PHALACROCORAX AFRICANUS, (Gm.) Adult, from Abyssinia. M. Malherbe previously favoured us with an example of the young of this species, from Algeria.†

Of reptiles, one species only is sent, *PSAMMOSAURUS SCINCUS*, (Merrem), v. *griseus*, (Daudin), from Nubia; and

Of fishes, only *CHEOMIS BOLTI*, Cuv., from the Nile.

* Erroneously coloured red in Hardwicke's figure.

† The following presumed identifications may be here suggested.

DRYMOICA INORNATA, (Sykes, 1832), with *DR. MYSTACEA*, Rüppell (1835).

DR. GRACILIS, Rüppell (1835), with *DR. LEPIDA*, nobis (1844).

MELANOCORYPHA RIMACULATA, Menetries, with *M. TORQUATA*, nobis, *J. A. S.* XVI, 476. (The latter is not a true *MELANOCORYPHA*, but the type of *CALAMODRINA*, nobis.)

PEDICANUS CRISPUS, Bruch, with *P. PHILIPPENSIS* (v. *roseus* et *manillensis*), Gmelin: nec *P. JAVANEUS*, Horsfield, which in India is equally common; while *P. ONCOTALUS* (*vérus*) is rare.

2. Capt. S. B. Tickell, Maubmein. A collection of bird-skins, from the mountainous interior of the Tenasserim provinces. This collection contains several new species; and among them is the female of apparently an undescribed Hornbill.

BUCCHOS TICKELLI, nobis, n. s. Length 25 or 26 in.; of wing 12 in.; and tail 11 in. Bill $4\frac{1}{2}$ in. from forehead, and 2 in. in greatest vertical depth, at $\frac{1}{2}$ of its length from base; the basal half of the upper mandible gibbous, or pinched up (as it were) into a sharp keel, which descends more abruptly upon the forehead (where concealed by the erect frontal feathers), and slopes evenly forwards till it disappears, at about $\frac{2}{3}$ of the length of the bill from base. Occipital crest ample; the feathers open-webbed, and with those of the crown fuscous-brown with narrow pale mesial line to each: upper-parts uniform dark fuscous-brown, with a slight gloss of green; the middle pair of tail-feathers coloured like the back, but the rest much darker, or glossy green-black,—as are likewise the primaries and secondaries, which are more or less margined with brown (nearly as in *B. GALERITUS*): some pale feathers at base of the winglet; and the 3rd to the 7th primaries (inclusive) have their outer web emarginated successively further from the base, the commencement of the emarginated portion of each being somewhat broadly edged with fulvous-white; primaries and rectrices tipped with dull white, more or less speckled with dusky: the entire under-parts dull rusty-isabelline, except the feathers at the base of the lower mandible, which are coloured like those of the crown; in texture the feathers of the lower-parts are loose and open-webbed, especially on the throat and front of neck. Bill intermixed dusky and yellowish-white, passing to yellow on the imperfectly developed casque.

This conspicuously distinct species from any other Hornbill which we have seen, was found by Capt. Tickell "confined to the great hills (the continuation of the Himalaya and Yo-ma-tung) which run N. and S. through the Tenasserim provinces, and form the back-bone of the Malayan peninsula. They are wild and wary, and keep to the summits of such colossal trees that it is no wonder Mr. Barbe and other collectors in this country never procured a specimen. I believe, however, that no European has ever been into those jungles besides myself. This Hornbill and *B. FUMIGATUS* have a steady even flight. All the others I have seen, viz. *CAVATUS*, *ALBICOSTRIS*, *NIPALENSIS*, *PICA*, and *BIMOSTRIS*, proceed with those singular flappings and sailings, so peculiar to this genus: and it is strange that these two species should offer so marked a distinction."

* Capt. Tickell has subsequently forwarded a more elaborate description of this Hornbill, for publication in the Society's Journal,

PARUS SUBVIRIDIS, Tickell, n. s. Affined to *P. XANTHOGENUS* and *P. SPILONOTUS*; but the whole of the under-parts dull yellowish-green without a trace of black, passing to ashy on the vent and lower tail-coverts: back much the same, but darker, with the feathers centred yellower, imparting a mottled appearance: crown and nape black, a few of the posterior long crest-feathers tipped with yellow: feathers at base of bill, the lores, cheeks and sides of neck, supercilia, and mesial nape-streak, bright yellow: wings and tail dull black, the great alars and caudals margined with ashy, and two or three of the primaries with whitish; a conspicuous white patch also at the base of the primaries; and the tertiaries are tipped on the outer web with an elongate whitish spot, this hue also extending up the inner web of the smallest tertiary: the smallest wing-coverts are tipped with ashy, and the first great range of wing-coverts with white upon both webs, the second range upon the outer web only; forming two cross-bands on the wing: the anterior half of the wing is white underneath, but the axillaries are light yellow: the outermost tail-feather has its exterior web dull white, and a spot of the same tipping the inner web; this spot being successively smaller on the penultimate and ante-penultimate tail-feathers: Bill black; and legs plumbeous. Length about $4\frac{1}{2}$ in.; of wing $2\frac{1}{2}$ in.; and tail 2 in.: longest crest-feathers $\frac{1}{2}$ in.

"Shot at an elevation of 3,500 ft. The *PARI* are very uncommon in the Tenasserim forests. In fact," remarks Capt. Tickell, "this is the only one I have seen."

PTERUTHIUS AERALATUS, Tickell, n. s. Quite similar to *PT. ERYTHROPTERUS* of the Himalaya, excepting that the latter has constantly the tertiaries wholly ferruginous in both sexes. In the Tenasserim bird, the female has the tertiaries greenish golden-yellow, like the secondaries, with merely a tinge of ferruginous upon the shaft and on the inner web only of each; and the male differs from that of the Himalayan bird by having nearly the whole outer webs of the tertiaries bright golden-yellow, the smallest having also a black tip and inner edge, the next a black tip to the outer web only, the third and longest an oblique and elongated black tip to the outer web only, and the feather succeeding this (or last of the secondaries) has also a mark $\frac{1}{2}$ in. long on its outer web of mingled ferruginous and golden-yellow. We also cannot perceive, in the male sent by Capt. Tickell, any trace of the carneous tinge, seen particularly on the flanks posteriorly of *PT. ERYTHROPTERUS*; and the female has the under-parts, with the exception of the white throat, only, much more fulvous than the under-parts of the female *PT. ERYTHROPTERUS*. The two species or races indeed manifest much the same relation-

ship to each other, as do *SERILOPHUS LUNATUS* (Gould), of Burma, and *S. EUROPYGIUS*, (Hodgson), of the S. E. Himalaya. The Tenasserim *PTERUTHIUS* was "found at an elevation of 3,500 to 4,500 ft."

GABULAX STERPITANS, Tickell, *n. s.* One of the *G. BELANGERI* and *G. LEUCOLOPHOS* series. Crown and occiput rich tawny-brown; the narial plumes, lores, cheeks and chin, blackish, passing into dull tawny-brown on the throat and front of the neck, and to a more ferruginous brown on the ear-coverts posteriorly: a large patch of white on the sides of the neck, pure and strongly contrasting with the dark crown and ear-coverts, but shading off gradually to ashy on the middle of the nape, the back, and sides of the breast: the ashy of the back shades off to greenish olive-brown on the rump, wings, and flanks, also on the vent, lower tail-coverts, and tibial plumes; passing on to blackish on the tail: breast and middle of the belly ashy, the pectoral feathers tawny-brown anteriorly. Bill and feet black. Length about 11 in.; of wing $4\frac{1}{2}$ in.; and tail 5 in., its outermost feather 1 in. shorter: bill to forehead $1\frac{1}{2}$ in.; and tarse $1\frac{1}{2}$ in.

"Common from 3,000 to 5,000 ft., and pre-eminently noisy."

G. MELANOSTIGMA, nobis, n. s. Affined to *G. ERYTHROCEPHALUS* and *G. RUFICAPILLUS*. Entire crown very bright rufo-ferruginous, contracting along the occiput: small frontal plumes, lores, and chin, black: sin-cipita and cheeks ashy, with black mesial streaks, more developed on the ear-coverts: general hue greenish olive-brown, having a tawny tinge on the nape, sides of neck, breast and middle of the belly, the breast being paler: throat and front of the neck rufo-ferruginous, shading into the duller hue of the breast: wings and tail bright greenish golden-yellow; the coverts of the primaries deep black, forming a conspicuous patch, and the next range of coverts bright ferruginous inclining to cinnamon-colour: secondaries and tertiaries conspicuously tipped with blackish. Bill black; and legs brown. Length about $10\frac{1}{2}$ in.; of wing $4\frac{1}{2}$ in.; and tail $4\frac{1}{2}$ in., its outermost feathers $1\frac{1}{2}$ in. shorter: bill to forehead 1 in. or nearly so; and tarse $1\frac{1}{2}$ in.

"Common, and found with the last; but ranging higher still, up to the vast wall-like crags of Moolé-it; 7,500 ft. Sexes alike."*

* The extraordinary development of this genus demands a new Conspectus of the species, for which the Society's museum affords better materials than perhaps any other. We have vainly tried to arrange them satisfactorily into minor groups; and cannot follow Mr. G. R. Gray in adopting the three headings of *GABULAX*, *TROCHALOPTERON*, and *PTEROCYCLOS* (the last pre-occupied in Malacology). The species not in the Society's museum are here distinguished by an asterisk.

TURDINUS CRISPIFRONS, nobis, n. s. Very like T. MACRODACTYLUS (*Malacopteron macrodactylum*, Strickland, v. *Brachypteryx albogularis*,

1. G. BELANGERI, Lesson, *Zoologie du Voyage de M. Belanger*, p. 258, with coloured figure: *Ianthocincla leucolophos*? var., apud nos, J. A. S. X, 924. Common in Pegu and the Tenasserim provinces.

2. G. LEUCOLOPHOS; *Corvus leucolophos*, Hardwicke (Gould's 'Century,' pl. 18). Himalaya; Asám; Khásya hills; Arakan.

*3. G. PERSPICILLATUS; *Turdus perspicillatus*, Gmelin; Shaw's 'Zoology,' X, 325; *le Merle de la Chine*, Buffon. China.

*4. G. BICOLORE, Müller; *Rev. Zool. &c.*, 1844, p. 402. Nearly allied to the three preceding species. From the west of Sumatra.

*5. G. MITRATUS, Müller. Of this we have seen no description.

6. G. STREPTITANS, Tickell, *ut supra*.

*7. G. CINEREIFRONS, Kelaart, nobis, J. A. S. XX, 176. Mountains of Ceylon.

*8. G. DELESSERTI; *Crateropus Delesserti*, Jerdon, *Madr. Journ.* X, 256 (*Ill. Ind. Orn.*, pl. 13): *Cr. griseiceps*, Delessert. Nilgiris.

9. G. CHINENSIS; *Lanius chinensis*, Scopoli: *Corvus auritus*, Gmelin: *Turdus shanho* et *T. melanotis*, Gmelin; *Crateropus leucogenys*, nobis, J. A. S. XI, 180. China; and also Tenasserim provinces (Ye): *vide* J. A. S. XXIII, 732. Remarkable for the rigidity of its frontal plumes.

10. G. CÆRULATUS; *Cinclosoma cærulatum*, Hodgson, *As. Res.* XIX, 147. S. E. Himalaya.

11. G. RUFICOLLIS; *Ianthocincla ruficollis*, Jardine and Selby (*Ill. Orn.* 2nd series, pl. 21): *I. lunaris*, McClelland and Horsfield. S. E. Himalaya; Asám; Sylhet; Tippera.

*12. G. RUFIFRONS; *Crateropus rufifrons*, Swainson, 2½ Centen. p. 290: *G. rubrifrons*, Lesson. Java.

13. G. ALBOGULARIS; *Ianthocincla albogularis*, Gould, *P. Z. S.* 1831, p. 187: *Cinclosoma albigula*, Hodgson, *As. Res.* XIX, 146. Himalaya; Khásya hills.

*14. G. GULARIS; *Ianthocincla gularis*, McClelland and Horsfield, *P. Z. S.* 1839, p. 159. Asám.

*15. G. MCCLELLANDII, nobis, J. A. S. XII, 949: *Ianthocincla pectoralis* apud McClelland and Horsfield, *P. Z. S.* 1839, p. 160. Asám. (Qu. G. MONILIGER, No. 17?)

16. G. PECTORALIS; *Ianthocincla pectoralis*, Gould, *P. Z. S.* 1835, p. 186: *Cinclosoma griseaure*, Hodgson, *As. Res.* XIX, 146: *G. melanotis*, nobis, J. A. S. XII, 149 (var.) Himalaya; Arakan; Tenasserim provinces.

17. G. MONILIGER; *Cinclosoma moniliger*, Hodgson, *As. Res.* XIX, 147. S. E. Himalaya; Asám; Tippera; Arakan; Tenasserim provinces.

18. G. MRAWLINUS, nobis, J. A. S. XX, 521. Khásya hills.

Hartlaub), of the Malayan peninsula (described *J. A. S.* XIII, 382); but smaller and non-rufous, with longer, softer, and more graduated tail, and

19. *G. OCELLATUS*; *Cinclosoma ocellatum*, Vigors, *P. Z. S.* 1831, p. 55. (Gould's Century, pl. 15). Himalaya.

20. *G. RUFOGULARIS*; *Ianthocincla rufogularis*, Gould, *P. Z. S.* 1835, p. 48: *Cinclosoma rufimenta*, Hodgson, *As. Res.* XIX, 148. Himalaya; Khásya hills; Tippera.

21. *G. SQUAMATUS*; *Ianthocincla squamata*, Gould, *P. Z. S.* 1835, p. 47: *Cinclosoma melanura*, Hodgson, *As. Res.* XIX, 147. (Jardine and Selby, *Ill. Orn.*, 2nd series, pl. 4). S. E. Himalaya; Khásya hills.

22. *G. SUBUNICOLORE*, Hodgson, *J. A. S.* XII, 952, XIV, 599. S. E. Himalaya.

23. *G. AFFINIS*, Hodgson, *J. A. S.* XII, 950. Nepal.

24. *G. VARIEGATUS*; *Cinclosoma variegatum*, Vigors, *P. Z. S.* 1831, p. 55: *G. Abellei*, Lesson. (Gould's 'Century,' pl. 16). N. E. Himalaya.

25. *G. CHRYSOPTERUS*; *Ianthocincla chrysoptera*, Gould, *P. Z. S.* 1835, p. 48. S. E. Himalaya.

26. *G. ERYTHROCEPHALUS*; *Cinclosoma erythrocephalum*, Vigors, *P. Z. S.* 1831, p. 171, (Gould's 'Century,' pl. XVII.) N. W. Himalaya; Nepal (nec Sikim).

27. *G. RUFIGAPILLUS*, nobis, *J. A. S.* XX, 521. Khásya hills.

28. *G. MELANOSTIGMA*, nobis, *ut supra*. Tenasserim provinces.

29. *G. PHÆNICUS*; *Ianthocincla phænicea*, Gould (*Icones Avium*): *Crateropus puniceus*, nobis, *J. A. S.* XI, 180. S. E. Himalaya; Khásya hills.

30. *G. (?) CACHINNANS*; *Crateropus cachinnans*, Jerdon, *Mad. Journ.* X, 255 (et pl. 7): *Cr. Lafremayeri*, Ad. Delessert; *Cr. Delesserti*, La Fresnaye (nec DELESSERTI, Jerdon). Nilgiris.

31. *G. (?) JERDONI*, nobis, *J. A. S.* XX, 522. Nilgiris.

32. *G. (?) LINEATUS*; *Cinclosoma lineatum*, Vigors, *P. Z. S.* 1831, p. 55: *Cinclosoma califerum*, Hodgson, *As. Res.* XIX, 148; *C. striatum* (?), Royle's list. Himalaya generally; Alpine Punjab.

33. *G. (?) IMBRICATUS*, nobis, *J. A. S.* XII, 951. Butan.

N. B.—*G. Felcia*, Lesson, = *LEIOTHEX STRIGULA* (Hodgson), v. *Muscicapa variegata*, Ad. Delessert, and *Leiothrix chrysocephala*, Jameson.

The last two species approximate the division *ACTINODURA*, Gould; to which are referred—

1. *A. ECKHOMI*, Gould, *P. Z. S.* 1836, p. 18: *Leiocincla plumbea*, nobis, *J. A. S.* XII, 950. (Figured in Gould's 'Birds of Asia,') S. E. Himalaya; Asám: Khásya hills. And

2. *A. NIPALENSIS*; *Cinclosoma nipalense*, Hodgson, *As. Res.* XIX, 145. (Also figured in Gould's 'Birds of Asia,') S. E. Himalaya. Then follows—

erect, short and stiff frontal plumes, which are much less developed in the other species: the rectal bristles are also much slighter. Length

**LEIOPHTILA ANNECTANS*, nobis, *J. A. S.* XVI, 450. Sikim. And, lastly, the genus *SIBIA*, Hodgson, comprising—

1. *S. PICOIDES*, Hodgson, *J. A. S.* VIII, 38: *Heterophasia cuculopsis*, nobis, *J. A. S.* XI, 187. S. E. Himalaya.

2. *S. GRACILIS*; *Hypsipetes gracilis*, McClelland and Horsfield, *P. Z. S.* 1839, p. 159; *J. A. S.* XVI, 149, XX, 521. Asám; Khásya hills.

3. *S. CAPISTRATA*; *Cinclosoma capistratum*, Vigors, *P. Z. S.* 1831, p. 85: *C. melanocephalum* (?), Royle's list: *S. nigriceps*, Hodgson, *J. A. S.* VIII, 38. Himalaya generally.

It is very remarkable that no species of this group has hitherto been noticed from the Malayan peninsula; and two or three only, as yet, in the great islands: but Capt. Tickell's recent discovery of two new species in the mountainous interior of the Tenasserim provinces renders it likely that others will yet be met with further south, when the loftier regions of the interior come to be explored. A recent author observes, that "although Malacca birds are among the very commonest in European collections, I am not aware that the country has been visited by any ornithologist. * * * There are two Portuguese resident in Malacca, whose sole business is procuring and selling the skins of mammalia and birds. They have numbers of the Malays of the interior in their employ, whom they furnish with ammunition, arseniated soap, &c. All the birds are skinned and put up by these Malays, who are paid a small sum per skin. The greater part of the birds thus come from one or two localities only, where, as this collecting has been going on for years, there can hardly be a new bird to be found." *Ann. Mag. N. H.*, Feb. 1855. Yet this author (Mr. A. R. Wallace) mentions certain species as having been procured by himself, during his nine weeks stay at Malacca, which we have never seen in collections from that neighbourhood, that had been purchased of the dealers referred to; and other species as being there common, which we have rarely seen in such collections (*NECTARINIA HYPOGRAMMICA* for example). It is very evident that the more dull-coloured species, and also those which are particularly abundant about the station (unless of remarkably showy plumage), are neglected. *ALCEDO BERYLLINA*, Vieillot (v. *A. biru*, Horsfield), is stated to occur there, and Helfer mentions it as an inhabitant of the Tenasserim provinces; but we have seen it from neither portion of that range of country, though likely enough to occur; and, of restricted *ALCEDO*, only *A. EURYZONA*, Tem., *A. MININGTING*, Horsf., and *A. BENGALENSIS*, Gmelin (the common Indian bird). Mr. Wallace's *HALCYON GULARIS* is probably the Indian *H. SMYRNENSIS*, which abounds in the Malayan peninsula, and accords precisely with the late Mr. Strickland's description of a Smyrna specimen! A Woodpecker is mentioned as "like *HEMICERCUS CONCRETUS*, but with head and crest of the same colour as the body."

about $7\frac{1}{2}$ in.; of wing 3 to $3\frac{1}{2}$ in.; and tail 3 to $3\frac{1}{2}$ in.; its outermost feather $\frac{1}{2}$ in. shorter: bill to gape 1 in.; and tarse the same. Colour deep non-rufous olive-brown, the feathers of the head, neck, and back, pale-shafted, and margined with black; a pure white speck at the tip of the smallest tertiary, and sometimes to that of the next, and probably of more: throat pure white, marked with dark olive, but differently from that of *T. MACRODACTYLUS*; in the latter species the feathers surrounding the throat are more or less broadly black-tipped; but in *T. CRISPIFRONS* they are black medially, with white outer edge and extreme tip, and the dark markings are less abruptly defined and do not surround and circumscribe the throat as in the other species: lower-parts tinged with ashy, mingled with whitish along the middle. Bill dusky, pale underneath and at tip; and legs dark olive-brown. "Not uncommon, but very local, and confined entirely to deep thickets amongst rocks."

T. BREVICAUDATUS, nobis, n. s. A third and more aberrant species, remarkable for its short tail, in which respect the Malayan *T. MACRODACTYLUS*, (Strickland), is intermediate to this and the preceding species. Size comparatively small. Length about $5\frac{1}{2}$ in., of which tail $1\frac{1}{2}$ in.; its outermost feather $\frac{3}{8}$ in. shorter than the medial: closed wing $2\frac{1}{2}$ in.; more rounded than in the two other species, having the sixth to the tenth primaries sub-equal and longest: bill to gape $1\frac{1}{8}$ in.: tarse $\frac{2}{3}$ in. Colour of the upper-parts much as in the preceding species, but somewhat more rufescent, and the feathers still softer and less elongated; of a rich olive-brown, black-bordered, and paler towards shaft; at forehead inclining to ashy, and scarcely stiffened: plumage over the rump discomposed, and excessively dense and copious: throat mingled dusky and whitish; and rest of the lower-parts weak ferruginous, deepest on middle of belly, vent

Can this be the adult female of *H. CONCRETUS*, which has the head and crest plain ashy? Whereas the young female has these parts fulvous, and the young male has the crown fulvous and the lengthened occipital crest dull crimson; the adult male having a crimson crown and ashy crest! The beautiful *MACROPTERYX COMATUS* is a novelty, as inhabiting the Malayan peninsula: also *PERICROCOTUS MINIATUS*, Tem. (if rightly identified,—we have seen the Indian *PER. SPECIOSUS* from Pinang!); "*IXOS ANALIS*, Horsf." is probably *PTYCNONOTUS CROCORRHUS*, Strickland. Mr. Wallace's *MUSCIPETA PARADISEA* is doubtless our *TCHITREA AFFINIS*, which it quite distinct from *TCH. PARADISI (vera)* of India: and his *PHYLLORNIS ICTEROCEPHALUS*, Tem., is doubtless *PH. COCHINCHINENSIS*, Lath., *apud nos*.—*Buceros nigrirostris*, nobis, proves (from this gentleman's observation) to be the female of *B. MALAYANUS*, Raffles (*v. anthracinus*, Tem.); of which Dr. S. Muller considered it to be a permanent variety.

and lower tail-coverts: a series of whitish terminal specks on the great range of wing-coverts, and others tipping the secondaries and tertiaries. Bill dusky above, pale below; and legs pale, with whitish claws.

These birds belong to a group which is pre-eminently difficult of classification, viz. the great *TIMALIA* series, which attains its maximum of development in the Malayan peninsula. As a genus or sub-genus, it is barely separable from *TRICHASTOMA*, nobis, and this again from *MALACOPTERON*, *ALCIPPE*, nobis (exemplified by *BRACHYPTERYX SEPIARIA*, Horsfield, and numerous other species affined to it). *TURDINUS* is distinguished by its robust form and especially by its peculiarly mottled plumage, the feathers being mostly pale-shafted and black-edged. It is not distantly affined to *PELLORNIVUS*.*

POMATORHINUS HYPOLEUCOS, nobis, var.? (*J. A. S.* XIII, 371; XIV, 599). Specimen remarkable for having narrow white mesial streaks to the feathers of the nape, chiefly towards the sides of the nape, which we can perceive no trace of in Arakan specimens; and similar well defined but wider streaks on the dark ash-coloured sides of the breast, which are little more than indicated in the Arakan specimens under examination. Bill to gape 2 in. Perhaps a distinct variety, more probably merely a particularly fine adult, of *P. HYPOLEUCOS*.†

* In a preceding note, we cited a paper on Malacca birds, by Mr. A. R. Wallace. The species which he remarked to be most abundant, were the different Bulbuls, "and the various strong-legged birds forming the genera *TIMALIA*, *MACRONOUS*, &c. These latter birds are found to be abundant both in species and individuals, when carefully searched for on the sides of roads and other places where there is a thick low jungle; while the former are found on every fruit-tree and about the Malay villages. Their affinities are most interesting and puzzling. I have eight species of birds," he adds, "all of an obscure dusky-olive plumage and nearly of the same size, which can only be distinguished by minute differences in the bill, or obscure markings in various parts of the plumage. They appear to belong to the genus *TRICHASTOMA*, Blyth; and are mostly fruit-eating birds, though they also feed freely on insects." Yet, although so common, we can rarely glean a specimen from the Malacca collections got up by the Portuguese dealers, which consist of the same ever recurring gaudy-coloured skins, *usque ad nauseam*. It may be inferred that a large proportion of the *TIMALIA* and *MALACOPTERON* series yet remain to be described.

† With reference to this species, Capt. Tickell writes—"I must beg to demur about its being classed in *POMATORHINUS*. Examine narrowly the bill, which will be found softer in texture (this, however, in a dry skin cannot be well perceived), and sub-cylindrical; whereas *POMATORHINUS* has the bill exceedingly

P. ALBOGULARIS, nobis, n. s. Though most closely affined to *P. PHAYREI*, nobis (*J. A. S. XVI*, 452), of the Arakan and Khásya hills, we consider this to be evidently a distinct race. It is a larger bird than *P. PHAYREI*, with the upper-parts of a finer and richer tawny hue, especially on the crown, and the lower-parts of a much fainter rufous; the white upon the throat is more extended, and passes gradually into the rufescent hue of the breast; the feathers at the base of the lower mandible are pure white, whereas in *P. PHAYREI* the upper half of them are black; there is also much more white on the upper-part of the loreal region, and the supercilia are broader and purer white. Length of wing $3\frac{7}{8}$ in.; of middle tail-feathers $4\frac{1}{2}$ in.; and of bill to gape $1\frac{1}{2}$ in. Specimen male.

(Of three closely affined species of this genus, *P. RUBIGINOSUS*, nobis, of Sikim, is distinguished by its black crown, and the deep rufo-ferruginous colour of its breast and long pointed loreal feathers; the hue of the upper-parts is also more rufescent than in the others: *P. PHAYREI*, nobis, of the Khásya and Arakan hills, has the crown of the same tawnyish olive-brown as the back, and the lower-parts are of a much weaker rufo-ferruginous than in *P. RUBIGINOSUS*; the loreal feathers are short, and the white supercilium is narrower than in the others and of the same breadth throughout: *P. ALBOGULARIS* has the lower-parts merely tinged with rufo-ferruginous; but the upper-parts are of rather a bright tawny-brown, and a supercilium commences from a large triangular white loreal patch, which is conspicuously bordered above with black. All have the cheeks and sides of the neck black; and the bill bright coral-red, which soon fades in the stuffed specimen, it being perhaps of a yellower coral-red in *P. PHAYREI*).

Both *P. HYPOLEUCOS* (var. ?) and *P. ALBOGULARIS* were procured by Capt. Tickell at the base of Moolé-it, at an altitude of 5 to 6,000 ft.*

compressed and hard. Then the shape of the head with its flat sinciput, and the fan-like broad tail,"—Should it be deemed advisable to detach *P. HYPOLEUCOS* from *POMATORHINUS*, a second and rather less typical species exists in *P. ERYTHROGENIS* of the Himalaya; and the Australian type, with very differently shaped wing, is still more distinct and separable.

* Of this genus, also, no species appears as yet to have been described from the Malayan peninsula; though there can be little doubt of its occurrence in the more elevated interior. In the islands, we know only of *P. MONTANUS*, Horsfield, in Java, *P. BORNEENSIS*, Cabanis, in Borneo, and *P. ISIDOREI*, Lesson, in New Guinea; all of which belong to the Indian type as distinguished from the Australian type of *POMATORHINUS*, which latter constitutes the *POMATOSTOMUS*, Cabanis, *Acrid.*

PHYLLOSCOPUS VIRIDIPENNIS, nobis, *n. s.* A fourth species of the *Reguloides* subgroup (*J. A. S. XXIII*, 487), and most nearly resembling *PH. CHLORONOTUS*; but readily distinguished from that species by having the rump uniformly coloured with the back, also by having a longer and differently coloured bill, and legs of much darker hue. From *PH. PROREGULUS* (*Regulus modestus*, Gould), it is distinguished by its inferior size and much brighter colouring; the mesial coronal streak being as much developed as in *PH. CHLORONOTUS*, and of a purer yellowish-white contrasting with a blacker shade of dusky: edge of wing considerably brighter yellow than in the others; the wing-band and also the tibial plumes tolerably bright yellow, the latter constituting another good distinction: but a further and more conspicuous distinction consists in the wing beyond its coverts being uniformly green, without a trace of the *REGULUS*-like variegation seen in *PH. PROREGULUS*, and less conspicuously in *PH. CHLORONOTUS*: there is no dusky patch posterior to the coverts, nor whitish tip or border to any of the great alars; but the secondaries are broadly margined with tolerably bright green, and the tertiaries are merely of a duller green throughout, brightening on their outer edge, and are not dusky and contrasting (as in the other species). In brief, *PH. VIRIDIPENNIS* may be described to have the upper-parts vivid olive-green, brightest on the margins of the wing and tail feathers: lower-parts albescent tinged with yellow: crown dusky mixed with green, with bright yellowish-white supercilia and coronal streak continued over the occiput, the supercilia more yellowish anteriorly: a broad pale yellow wing-band formed by the tips of the great coverts of the secondaries; and the smaller range of wing-coverts slightly tipped with yellowish: tibial plumes bright yellowish: the margin of the wing pure canary-yellow: upper mandible wanting in the specimen, but the lower is wholly yellow. Legs infuscated-brownish. Length about 4 in., of which tail $1\frac{1}{2}$ in.: wing 2 in.; having the short first primary $\frac{1}{2}$ in., the second $\frac{3}{4}$ in. longer than the first, and $\frac{3}{8}$ in. shorter than the longest primaries. Bill to gape $\frac{1}{2}$ in.; and tarse $\frac{1}{2}$ in.

HYPsipETES TICKELLI, nobis, *n. s.* Very like *H. MACLELLANDII*, Horsfield; but devoid of rufous tinge on the breast and lower-parts, which are uniformly coloured with the throat, and the throat-feathers are less elongated and pointed than in the other: axillaries bright yellow; and much of the under surface of the wing pale sullied yellow: lower tail-coverts dull yellow: upper-parts dull olive-green, slightly washed with rufous on the back; the wings and tail brightish golden-green, much less rufescent than in *H. MACLELLANDII*: crown dingy rufous-brown, the

feathers pale-shafted and pointed, but less elongated than in the other: ear-coverts dull greyish; and a very faint tinge of ferruginous on the sides of the neck. Bill dusky; and legs pale brown. Bill to gape $1\frac{1}{2}$ in.; the latter defended by strong *vibrissæ*: closed wing 4 in.: tail the same: tarse $\frac{3}{4}$ in.

ARBORICOLA BRUNNEOPECTUS, Tickell, *n. s.* On a former occasion, *J. A. S.* XVIII, 819, we distinguished three species of the Green or Hill Partridges of Anglo-Indian sportsmen,—viz. *A. TORQUEOLA* (*Perdix torqueola*, Valenciennes; *P. megapodia*, Temminck; v. *P. olivacea*, Gray); which appears to be the only species found in the Simla and Masuri hills, and in Sikim inhabits at a greater elevation than the next:—*A. RUFOGULARIS*, nobis, common in Sikim, and which Capt. Tickell has now sent from the Tenasserim mountains; and *A. ATROGULARIS*, nobis, which is common in the mountains of Asám, Sylhet, if not also those of Arakan. We have since seen many dozens of living examples of the last from Sylhet, and remarked that there is no apparent sexual diversity, and but slight individual variation; and this we now suspect to be also the case with the second species, the supposed females referred to which formerly we now suspect were that sex of *A. TORQUEOLA*. Capt. Tickell now sends a specimen of a fourth, found together with *A. RUFOGULARIS* at an elevation of from 3000 to 5000 ft. “They are tame and easily shot as they run along the ground.” In *A. RUFOGULARIS*, both sexes appear to have the chin and throat deep ferruginous, the former speckled with black, the latter with an inferior black border more or less developed: breast dark ashy, tolerably pure, and passing to white on the middle of the belly: flanks varied with ferruginous on the sides of the feathers, which have an elongated medial white spot, less developed than in the males of *A. TORQUEOLA*: back plain, or with but the faintest possible indication of terminal dusky margins to the feathers (which must be looked for to be observed at all): the scapularies with large black spots, and scarcely any trace of white medial lines; and the crown brown, often black-spotted, and passing to ashy on the forehead.—*A. ATROGULARIS* has a very broad white moustachial streak; and the throat black, passing into white below, the latter ill defined and spotted with black. the spots gradually disappearing on the pure ashy breast: no trace of ferruginous on the flanks, which have small narrow white spots, often obsolete or nearly so: crown brown, more or less black-spotted, and passing to ashy on the forehead; and the back conspicuously barred with black, two or three narrow transverse bands upon each feather: scapularies with black spots more or less developed, but with no white mesial streaks, and little trace of rufous or ferruginous.

—*A. BRUNNEOPECTUS* has the breast and flanks tawnyish-brown instead of ashy, with no admixture of ferruginous on the latter, which are spotted quite differently from those of any of the other species; each feather having a large rounded white spot, broad black terminal border, and another spot of black above the white: throat fulvous-white, passing to black in front of the neck, but no white below this as in *A. ATROGULARIS*, nor do the black spots descend visibly upon the breast, though on turning up the feathers, a rudiment appears upon each of the black and white markings which become so developed on the flanks: crown brown, black-spotted, and passing to whitish-brown on sides of forehead: back and scapularies scarcely differing from those of *A. ATROGULARIS*. Beak (of specimen examined) conspicuously larger than in the others.

A. INTERMEDIA, nobis, *n. s.* We believe this to constitute a fifth species, *probably* from Arakan. It has a black throat, succeeded by a great palish ferruginous patch which nearly surrounds the neck, and is in front spotless, but has large round black spots on the sides of the neck: rest of the plumage nearly as in *A. RUFOGULARIS*, but the general colour paler.

The other species sent by Capt. Tickell are *ATHENE CUCULOIDES*, *MEGALAIMA FRANKLINII*, *HEMICEBUS CANENTE*, *CHEYSOCOLAPTES SULTANEUS*, *GECCINUS CHLOROLOPHUS*, *PHŒNICOPIHAUS CURVIBOSTRIS*, *HARPACTES ERYTHROCEPHALUS*, *LYNCOERNIS CERVINICEPS*, *PHILORHINUS SINENSIS* (var.), *ALCIPPE NIPALENSIS*, *STACHYRIS NIGRIFRONS*, *TEPHRODORNIS PELVICA*, *TURDUS RUFULUS*,* *PRATINCOLA INDICA*, *CYORNIS RUBECULOIDES*, *CORYDON SUMATRANUS*, *EURYLAIMUS JAVANICUS*, *SERILOPHUS LUNATUS*, *PHARISOMUS DALHOUSIE*, *PERICROCOTUS*——?,† *CAMPEPHAGA FIMBRIATA*, *HIRUNDO URBICA* (!),‡ *TCHITREA AFFINIS*, *CRINIGER FLAVEOLUS*, *IOLE VIRESCENS*, *HEMIXOS FLAVALA*, *PHYLLOERNIS HARDWICKII*, *PH. AURIFRONS*, and *PH. SONNERATII*.

Of the Owl, he remarks—"If this be true *CUCULOIDES*, there is a species in the Sikim hills hitherto unnamed; but which I used to suppose

* *T. RUFULUS*, Drapiez; *T. modestus*, Eyton: Qu. *T. JAVANICUS* (?), Horsfield; *T. concolor* (?), Temminck.

† Capt. Tickell insists that the specimen sent is the female of *P. BREVIROSTRIS*: to us it appears rather that of *P. SOLARIS*, nobis; having a pale throat and dark forehead.

‡ Capt. Tickell writes—"There are great numbers of these here" (at Maulmein) "in the season; and I have also seen large flocks of them in India, but they appear from time to time, not constantly as does *H. RUSTICA*."

was *CUCULOIDES*. It is coloured almost exactly like *A. BRODIERI*, from which it differs in its much larger size. The bird I now send is the Tenasserim substitute for my *A. RADIATA*, which it almost exactly resembles in note and habits: being diurnal and crepuscular; whereas *A. BRODIERI* and the other above alluded to are strictly nocturnal, and have a very different note."—We can detect no difference between this and other Tenasserim specimens, and others from the Himalaya, and one from Chusan; and have repeatedly received examples from Asám, Sylhet, and Arakan.

"The Barbet," continues Capt. Tickell, "I have shot at Darjiling, where it is not common.* But in the Tenasserim mountains it swarms from 3,000 to 5,000 ft. elevation, not higher, nor lower,—and from the first level it suddenly and entirely supplants *M. LINEATA*, the *Pokoung* of the Burmese. As long as day lasts, the woods amongst the Dauna hills resound with its cry—*piow, piow, piow*, &c. &c. There is another Barbet, smaller and resembling apparently the *M. INDICA*, which is also pretty common, from 1,000 to 3,500 ft.; but it settles *solely* on the summits of the hugest trees, calling out *tapral, tapral, tapral*, by the hour together; and I have found it impossible to procure with the gun: so small an object at such a vast height cannot be hit.† Mr. Parish, our chaplain, was with me on one of my excursions, and measured the trunk of one of these giants of the forest which had fallen across a little brook. The smooth bole, before a single limb branched out, was 130 ft. long."

The *PHENICOPHAUS CURVIOSTREIS* and *PHYLLOENIS SONNERATII* have heretofore been only known as Malasian species. The former was observed by Capt. Tickell "on low jungly hills,—very like *PH. TRISTIS* in habits: scarce: a pair shot were both precisely similar, except in colour of iris; the male having that cobalt blue, and the female orange. Food *Coleoptera*, *Hemiptera*, and very large caterpillars.

"*HARPACTES ERYTHROCEPHALUS* was common in the hills from 3,000 ft. upwards. Below that it is replaced by *H. ORESKIOS*. It flies in small troops, and is active and vociferous in the morning, solitary and quiet during the heat of the day, sitting in the shade. It appears larger and brighter than in Nepal and Sikim." The specimens sent are certainly brighter than, but do not exceed in dimensions, others from Darjiling, Sylhet, &c.

* Mr. Hodgson procured it in Nepal; and we have received it from the Khásya hills, and from those of Arakan.—*Cur. As. Soc.*

† Probably *M. TRIMACULATA* (var. *cyanotis*). *Cur. As. Soc.*

The *PSILORHINUS SINENSIS*, (L.), var., is of the same race which we formerly termed *Ps. magnirostris* in *J. A. S.* XV, 27; the great size of the bill proving merely to be an individual peculiarity; but the colouring is considerably finer and more intense than in Himalayan specimens, which latter (as we are assured) are perfectly similar to examples from China.

The *ALCIPPE NIPALENSIS* (v. *Siva nipalensis*, Hodgson,) was "common, but local, in hilly jungles up to 4,000 ft. I found," adds Capt. Tickell, "*LEIOTHEIX ARGENTAUROS* and *SIVA STRIGULA*, about the sides of Moolé-it. *STACHYRIS NIGRICEPS*, in hilly forests, 3000 ft. *CORYDON SUMATRANUS* is a singular and rare bird. Of its habits little or nothing is known. I can only say that it is crepuscular (very likely diurnal as well), and so stupid and tame as to allow itself to be pefted without moving. *EURYLAIMUS JAVANICUS* is not common: at least it is not often seen; being very quiet and secluded, though excessively tame, and not crepuscular like *CORYDON*. *SERILOPHUS LUNATUS*. These birds are much freer flyers than *EURYLAIMUS*. I found them once, in a flock, hurrying about like Titmice, but very high up. *CALYPTOMENA VIRIDIS*. These birds resort to dense thickets when alarmed, but will sally out to feed on fruit (wild figs, &c.), and they mingle with Barbets and other birds in so doing. The note is low and sweet—a mellow whistle. Like the *EURYLAIMI*, they are tame and stupid.*

"I obtained," continues Capt. Tickell, "the egg of *BUCCEROS CAVATUS*; and "have seen with my own eyes that the male builds the female in, by covering the hole in the tree, where she incubates, with mud, leaving only room for her bill to protrude and receive food from his! I thought that this was a fable." (The same is stated in the Rev. J. Mason's 'Tenas-serim,' &c., p. 274.) Of mammalia, Capt. Tickell "got nothing particular. Indeed, I never saw a country so utterly void of large game."

Finally, he obtained the young, about a month old, of the large pouched *Hargila* (*LEPTOPTILOUS ARGALA*). The fact of this bird breeding in the Provinces was long ago announced to us by Capt. Sparkes; who stated—"With regard to the 'Adjutant's' nest, I was out surveying in December, 1848, in the district of Moulmein, at a place about five miles to the east of the town; and having occasion to ascend some eminence to obtain a

* Of *PSARISOMUS DALHOUSIE*, Mr. Frith informs us, that flocks often ascend to the table-land of Cherra Panji; where, as they fly across the open ground from garden to garden, the native boys hunt them by intercepting and turning their flight away from the gardens, when they are soon fatigued and easily caught by the hand.

good *coup d'œil* of the surrounding country, I determined to climb to the top of the highest peak of the Kharong hills, a detached mass of limestone rock which rises almost perpendicularly out of an extensive level plain, to the height of 600 feet. The ascent was extremely difficult and dangerous, and had never before (as the people assured me) been attempted by an European. On gaining the summit I found that I was immediately over the top of a large tree—which sprung from a crevice in the rock below: and on its highest branches was an 'Adjutant's' nest, composed of dry sticks very rudely interlaced [or merely heaped together?] making a flat platform as it were, with little or no perceptible cavity towards the centre. In this were two young 'Adjutants,' about the size of small Geese, covered with a *white* down, and with pouches and beaks ridiculously disproportioned to their size, being extraordinarily large. Both of the young were taken by one of my Burmese servants. In another similar nest, in an adjoining tree, were one young one, and one addled egg, of a *spotless dirty white* and somewhat larger than a Turkey's egg."

Mr. R. W. G. Frith informs us that he found both of the species of 'Adjutant' breeding in the S. E. part of the Sundarbáns. Their nests were placed on the tops of the loftiest trees, and were extremely difficult and hazardous to approach, from the density of the undergrowth and the great number of Tigers which infest the vicinity. In fact the nests were only to be approached by means of the tracks made by Rhinoceroses, Buffaloes, &c., through the jungle. The large or pouched species breeds about a month earlier in the season than the other, immediately (it would seem) after its arrival from the places which it frequents during the rainy season. They are then in the finest state of plumage; ash-grey, with the pale wing-band complete; and, for the most part, they have but just perfected their plumage when they leave Calcutta at the end of the rains. In the same neighbourhood, Mr. Frith was credibly assured that the huge *ARDEA GOLIATH*, Rüppell (*A. nobilis*, nobis, &c.),* also bred; and he expects to be able to procure the eggs of all three species during the next breeding season.

A further notice of the 'Adjutant' may be here cited. In Lower Bengal, we see the adult birds only during the rains; though the young remain throughout the year, congregating about *abattoirs* and such places. At Masuri, Capt. Hutton remarks—"The 'Adjutant' is a sure forerunner of the rains with us, appearing always about a fortnight before they

* These are recognised as distinct by the Prince of Canino. *Comptes Rendus*, XL (1855), p. 722.

commence. They do not alight on the hills, but are seen soaring about high above us in circles. I have seen them regularly every year; and in 1843 noted their first appearance on the 2nd June. They appear to come from the interior towards the plains. I have never seen them *during the rains* on the hills nor in the Deyra Doon."

It is not generally known that our large pouched *Hargila* is also an African bird. Dr. Rüppell notices its occurrence in Nubia and Abyssinia in small flocks.

E. BLYTH.

Corrigenda, for Report for February Meeting, pp. 178 ante.

- p. 178, l. 3 from bottom. "For NYCTICIGUS," read NYCTICEJUS.
 ,, 179, ,, 2. For "ceiniger," read CRINIGER.
 ,, ,, note, l. 2. For "Coccothrauses," read Coccothraustes. ,
 ,, 180, ,, 12. For "Tenasserin," read Tenasserim.
 ,, ,, ,, 13. For "TINUNCULUS," read TINNUNCULUS.
 ,, ,, ,, 19. For "CYANOGARULUS," read CYANOGRARRULUS.
 ,, ,, ,, 24. For "CERGÆA," read CERGÆA.
 ,, ,, ,, 25. For "MARILARDICA," read MARILANDICA.

LIBRARY.

The following additions have been made to the library since the last meeting.

Presented.

Mittelsyrien und Damascus, Geschichtliche Ethnographische und Geographische Studien, von Alfred V. Kremer. Wien, 1853, 8vo.—BY THE AUTHOR.

Description de l'Afrique par un Géographe Arabe anonyme du sixieme Siecle de l'Hègire. Text Arabe publié pour la premiere fois par M. A. de Kremer. Vienne, 1852, 8vo.—BY THE EDITOR.

Report of the Calcutta Public Library, for 1854.—BY THE CURATORS.

Thirty-second Annual Report of the Parental Academic Institution and Doveton College.—BY THE PRINCIPAL.

The Upadeshak, No. 99.—BY THE EDITOR.

The Calcutta Christian Observer, No. for March, 1855.—BY THE EDITORS.

The Oriental Baptist, No. 99.—BY THE EDITOR.

Notice Historique sur M. M. Burnouf, Pere et Fils. Par M. Roudet. Paris, 1854, Pamphlet, 4to.—BY THE AUTHOR.

Exchanged.

The Athenæum, for December, 1854.

The Calcutta Review, for December, 1854.

The Philosophical Magazine, No. 56.

Purchased.

The Annals and Magazine of Natural History, for January, 1855.

Comptes Rendus, Nos. 23 to 26 of 1854 and 1 of 1855.

Journal des Savants, for December, 1855.

Amír Hamzah, 1 vol. 4to.

March 31st, 1855.

RA'JENDRALA'L MITTRA.

Meteorological Register kept at the Office of the Secretary to Government, N. W. P. Agra, for the month of February, 1855.

Maximum pressure observed at 9.50 A. M.

Date.	Barometer.	Temperature.			Direction of Wind.	Quantity of Rain.	Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.			
1	29.715	63.5	65.0	53.0	W.	..	Clear
2	29.665	65.0	66.6	55.4	W.	..	~ scattered towards hor.
3	29.619	65.5	66.5	55.9	S. E.	..	~ scattered
4	29.679	65.0	66.4	55.5		..	Clear
5	29.673	66.0	68.7	58.2	N. E.	..	Ditto
6	29.805	66.9	68.5	56.0	N.	..	Ditto
7	29.755	64.4	65.4	55.0	N.	..	Ditto
8	29.629	66.9	67.7	56.0	S. W.	..	Ditto
9	29.555	69.	70.9	58.4	N.	..	Ditto
10	29.639	69.9	71.8	58.6	N. E.	..	Ditto
11	29.561	71.5	72.9	62.0	E.	..	Ditto
12	29.577	68.9	69.9	58.0	N. E.	..	Ditto
13	29.543	66.6	68.3	58.0	N. W.	..	Ditto
14	29.609	69.0	70.3	56.4	N. W.	..	Ditto
15	29.487	68.9	69.9	56.0	N. W.	..	~ scattered all over
16	29.497	71.0	73.8	59.0	N. E.	..	Clear
17	29.491	71.9	74.0	58.4	N. E.	..	~ scattered
18	29.489	66.0	64.0	62.0	N. E.	..	~ all over
19	29.409	64.8	64.6	62.5	E.	..	~ scattered
20	29.475	65.0	65.2	58.5	W.	..	Clear
21	29.459	66.5	67.3	59.0	N. W.	..	Ditto
22	29.509	65.9	67.4	59.4	N. W.	..	~ scattered
23	29.479	71.1	71.7	62.0	N. W.	..	~ scattered towards hor.
24	29.555	70.0	71.0	64.0	S.	..	~ scattered in zenith
25	29.535	72.2	74.3	62.1	N.	..	Clear
26	29.663	73.0	74.9	60.7	N.	..	~ very few scat. in zenith.
27	29.655	74.5	75.4	61.5	N. W.	..	Clear
28	29.577	73.0	73.8	63.0	S. E.	..	~ scattered
Mean.	29.582	67.2	69.5	58.7	..	..	...

Barometer Observations corrected for Capillarity only.

Symbols.

- ~ Cirrus.
- ~ Cirro strata.
- ~ Cumuli.
- ~ Cumulo strata.
- ~ Nimbi or Nimbus.

Meteorological Register kept at the Office of the Secretary to Government, N. W. P. Agra, for the month of February, 1855.

Observations at apparent Noon.

Date.	Barometer.	Temperature.			Direction of Wind.	Quantity of Rain.	Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.			
1	29.669	68.8	69.6	55.3	W.	..	Clear
2	29.619	70.0	72.0	55.5	W.	..	✓ scat. towards E. hor.
3	29.583	69.8	72.1	57.8	E.	..	✓ scattered
4	29.655	67.2	68.5	56.3		..	
5	29.633	70.8	73.8	59.0	N. E.	..	Clear
6	29.779	71.0	72.4	57.0	N.	..	Ditto
7	29.695	70.9	71.7	56.0	N. W.	..	Ditto
8	29.579	71.5	72.8	58.0	W.	..	Ditto
9	29.505	73.8	74.8	59.5	S. W.	..	Ditto
10	29.575	75.5	77.3	61.0	E.	..	Ditto
11	29.525	79.3	80.7	63.0	E.	..	Ditto
12	29.543	75.2	77.0	59.9	N.	..	Ditto
13	29.513	74.2	75.6	60.0	N. W.	..	Ditto
14	29.579	74.9	76.9	57.5	N. W.	..	Ditto
15	29.447	75.5	76.5	57.5	N. W.	..	✓ scattered towards W.
16	29.461	75.0	76.0	60.5	E.	..	Clear
17	29.447	75.0	76.0	62.6	N. E.	..	✓ scattered
18	29.437	65.0	63.5	62.1	N.	092	✓ all over
19	29.369	66.7	66.9	64.1	N. W.	..	✓ scattered
20	29.451	69.0	70.9	57.5	S.	..	Clear
21	29.407	70.4	71.6	60.2	N. W.	..	Ditto
22	29.489	72.0	73.5	60.4	W.	..	✓ scattered towards S.
23	29.445	74.5	75.0	63.4	S. E.	..	✓ very few scattered
24	29.517	73.5	73.6	62.5	S.	..	Clear
25	29.493	75.5	76.8	62.7	N. W.	..	Ditto
26	29.635	76.4	78.0	60.7	N. E.	..	Ditto
27	29.605	77.6	78.0	62.5	E.	..	Ditto
28	29.527	77.0	77.8	64.5	S. E.	..	✓ scattered
Mean.	29.542	72.7	77.4	59.8	..	..	....

Meteorological Register kept at the Office of the Secretary to Government, N. W. P. Agra, for the Month of February, 1855.

Minimum pressure observed at 4 P. M.

Date.	Barometer.	Temperature.			Maximum and Minimum.			Aspect of the Sky.	Direction of Wind.	Quantity of Rain.
		Of Mercury.	Of Air.	Wet Bulb.	Maximum.	Minimum.	Mean.			
1	29.609	74.5	74.3	54.5	74.7	51.5	63.1	scat. in zenith	W.	..
2	29.565	74.9	74.5	57.8	75.5	53.2	64.35	Clear	N. W.	..
3	29.515	73.0	73.0	60.2	74.7	59.5	67.1	scattered	E.	..
4	29.597	72.0	72.3	57.5	72.5	55.0	63.75			..
5	29.589	74.0	75.0	59.0	75.0	55.0	65.0	Clear	N.	..
6	29.729	74.8	75.0	58.0	74.2	54.5	64.35	scattered	N. W.	..
7	29.655	75.3	74.6	60.0	74.6	53.0	63.8	Clear	N. W.	..
8	29.505	76.8	75.0	60.5	78.8	58.8	68.8	scattered	N. W.	..
9	29.475	78.5	79.0	60.5	79.0	60.0	69.5	Clear	N. W.	..
10	29.519	79.9	81.0	62.0	80.9	61.0	70.95	scattered	E.	..
11	29.483	82.1	82.4	64.5	82.0	62.5	72.25	Clear	E.	..
12	29.477	81.9	82.2	62.2	82.0	60.5	71.25	Ditto	N. W.	..
13	29.459	79.9	79.3	60.4	80.2	59.0	69.6	scattered	N. W.	..
14	29.495	80.2	80.5	60.2	80.2	57.0	68.6	very few scat. in	N. W.	..
15	29.395	78.0	77.0	61.2	77.0	57.5	67.25	all over [zenith.	W.	..
16	29.397	78.9	79.9	61.4	79.9	60.5	70.2	Clear	N. E.	..
17	29.349	79.0	79.0	63.6	79.5	62.7	71.1			..
18	29.405	67.2	67.0	62.3	67.0	62.0	64.5	scattered	N.	..
19	29.319	71.9	71.9	64.3	71.5	60.5	66.0	scattered	N. W.	..
20	29.401	76.0	75.9	60.5				Clear	W.	..
21	29.389	77.3	77.0	61.9				Ditto	N. W.	..
22	29.393	80.9	79.6	64.3				scattered [N. W.	N. W.	..
23	29.385	73.0	77.5	63.5				scattered towards	N.	..
24	29.471	77.5	77.2	63.0				scattered	S. E.	..
25	29.447	78.9	79.2	64.1				ditto [zenith	N. W.	..
26	29.571	81.5	82.5	62.8				very few scat. in	N. W.	..
27	29.505	81.0	82.0	63.4				scattered	E.	..
28	29.471	79.9	79.0	66.2				ditto	S. E.	..
Mean.	29.484	77.2	77.1	61.4	76.8	58.0	67.4	...	..	..

As the Max. and Min. Registers were out of order.

Observations not taken from the 20th to the 28th of February.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in the
month of November, 1854.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Daily Means, &c. of the observations and of the hygrometrical elements •
dependent thereon.

Date.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempe- rature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.921	30.008	29.847	0.161	80.7	87.2	76.2	11.0
2	.859	29.932	.799	.133	81.1	87.6	76.6	11.0
3	.880	.955	.819	.136	82.2	88.0	78.0	10.0
4	.882	.961	.824	.137	80.8	86.8	77.2	9.6
5	<i>Sunday.</i>							
6	.871	.935	.810	.125	78.7	83.6	75.0	8.6
7	.870	.918	.834	.084	74.3	79.0	71.2	7.8
8	.858	.934	.774	.160	73.8	77.6	70.2	7.4
9	.979	30.039	.900	.139	76.4	82.8	71.8	11.0
10	30.070	.141	30.013	.128	75.2	82.0	69.0	13.0
11	.080	.142	.031	.111	74.2	81.4	68.3	13.1
12	<i>Sunday.</i>							
13	.018	.094	29.965	.129	72.4	81.0	65.2	15.8
14	29.986	.061	.929	.132	74.4	82.7	67.8	14.9
15	.982	.050	.931	.119	75.8	82.5	70.9	11.6
16	.992	.074	.939	.135	75.4	82.8	70.4	12.4
17	30.021	.101	.972	.129	74.6	82.8	68.6	14.2
18	29.997	.075	.928	.147	72.6	81.5	65.8	15.7
19	<i>Sunday.</i>							
20	30.019	.078	.971	.107	69.9	78.8	63.0	15.8
21	.054	.126	30.006	.120	70.2	79.7	61.8	17.9
22	.057	.145	29.997	.148	70.8	79.6	63.6	16.0
23	.025	.085	.955	.130	71.0	78.2	64.7	13.5
24	.037	.111	.998	.113	71.9	79.6	65.4	14.2
25	.072	.150	30.024	.126	71.5	79.7	65.6	14.1
26	<i>Sunday.</i>							
27	.017	.091	29.945	.146	72.4	79.6	65.6	14.0
28	29.997	.061	.933	.128	72.6	80.0	66.8	13.2
29	30.015	.082	.957	.125	72.3	80.4	66.0	14.4
30	.052	.136	.994	.142	72.5	80.6	66.2	14.4

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in the
month of November, 1854.*

Daily Means, &c. of the observations and of the hygrometrical elements
dependent thereon. (Continued.)

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	77.7	3 0	76.2	4.5	0.887	9.56	1.48	0.866
2	78 0	3.1	76.4	4.7	.893	.62	.55	.861
3	79.0	3.2	77.4	4.8	.922	.91	.63	.859
4	77.5	3.3	75.8	5.0	.876	.44	.63	.853
5	<i>Sunday.</i>							
6	76.1	2.6	74.8	3.9	.849	.19	.22	.883
7	72.5	1.8	71.6	2.7	.766	8.35	0.77	.916
8	71.8	2.0	70.8	3.0	.746	.15	.83	.908
9	73.1	3.3	71.4	5.0	.761	.27	1.45	.851
10	70.7	4.5	68.4	6.8	.690	7.51	.86	.801
11	69.4	4.8	67.0	7.2	.659	.20	.89	.792
12	<i>Sunday.</i>							
13	67.4	5.0	64.9	7.5	.615	6.74	.86	.784
14	70.5	3.9	68.5	5.9	.692	7.56	.59	.826
15	71.9	3.9	69.9	5.9	.725	.88	.66	.826
16	71.4	4.0	69.4	6.0	.713	.77	.66	.824
17	70.0	4.6	67.7	6.9	.674	.36	.84	.800
18	67.4	5.2	64.8	7.8	.613	6.72	.94	.776
19	<i>Sunday.</i>							
20	64.9	5.0	62.4	7.5	.567	.23	.75	.781
21	65.5	4.7	63.1	7.1	.580	.38	.67	.793
22	66.6	4.2	64.5	6.3	.607	.68	.52	.815
23	66.7	4 3	64.5	6.5	.607	.67	.58	.808
24	67.8	4.1	65.7	6.2	.632	.94	.54	.818
25	67.3	4.2	65.2	6.3	.621	.83	.55	.815
26	<i>Sunday.</i>							
27	68.5	3.9	66.5	5.9	.648	7.10	.50	.826
28	68.7	3.9	66.7	5.9	.653	.14	.52	.824
29	68.0	4.3	65.8	6.5	.634	6.94	.64	.809
30	68.1	4.4	65.9	6.6	.636	.96	.67	.806

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in
the month of November, 1854.*

**Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.**

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid-night.	29.982	30.078	29.828	0.250	71.7	79.2	65.4	13.8
1	.976	.082	.819	.263	71.2	78.8	64.8	14.0
2	.967	.073	.805	.268	70.7	78.6	64.2	14.4
3	.960	.067	.790	.277	70.4	78.8	63.9	14.9
4	.958	.056	.774	.282	70.0	78.3	63.0	15.3
5	.966	.076	.781	.295	69.5	78.2	62.6	15.6
6	.986	.088	.813	.275	69.2	78.0	61.8	16.2
7	30.011	.111	.848	.263	69.3	78.8	62.2	16.6
8	.037	.128	.875	.253	72.4	80.8	66.7	14.1
9	.055	.150	.897	.253	74.8	82.8	70.2	12.6
10	.051	.144	.898	.246	76.8	84.2	73.2	11.0
11	.033	.132	.888	.244	78.8	85.4	75.2	10.2
Noon.	.003	.107	.874	.233	80.0	86.4	76.0	10.4
1	29.970	.080	.842	.238	80.8	87.2	73.6	13.6
2	.949	.059	.818	.241	81.4	87.6	74.0	13.6
3	.938	.041	.803	.238	81.2	88.0	71.2	16.8
4	.936	.033	.799	.234	79.4	86.6	72.0	14.6
5	.942	.042	.803	.239	78.1	85.4	72.0	13.4
6	.951	.052	.820	.232	76.2	84.0	71.9	12.1
7	.974	.078	.846	.232	75.0	82.8	70.2	12.6
8	.991	.087	.850	.237	73.9	81.6	68.7	12.9
9	30.000	.094	.861	.243	73.1	81.0	68.2	12.8
10	.002	.112	.866	.246	72.4	80.6	67.2	13.4
11	29.998	.084	.865	.219	71.9	79.8	66.2	13.6

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in
the Month of November, 1854.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Hour.	Mean Wet Bulb Thermo- meter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional weight of va- pour required for com- plete saturation.	Mean degree of Humidity, complete saturation be- ing unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	69.7	2.0	68.7	3.0	.697	7.64	0.79	0.906
1	69.3	1.9	68.3	2.9	.688	.55	.75	.910
2	68.9	1.8	68.0	2.7	.681	.48	.70	.914
3	68.6	1.8	67.7	2.7	.674	.42	.68	.916
4	68.2	1.8	67.3	2.7	.666	.33	.67	.916
5	67.9	1.6	67.1	2.4	.661	.29	.59	.925
6	67.6	1.6	66.8	2.4	.655	.23	.58	.926
7	67.8	1.5	67.0	2.3	.659	.27	.56	.928
8	69.5	2.9	68.0	4.4	.681	.47	1.13	.869
9	70.8	4.0	68.8	6.0	.699	.62	.64	.823
10	71.6	5.2	69.0	7.8	.704	.64	2.19	.777
11	72.3	6.5	69.0	9.8	.704	.60	.84	.728
Noon.	72.7	7.3	69.0	11.0	.704	.59	3.22	.702
1	73.1	7.7	69.2	11.6	.708	.62	.45	.688
2	73.3	8.1	69.2	12.2	.708	.62	.65	.676
3	73.0	8.2	68.9	12.3	.701	.55	.66	.674
4	72.3	7.1	68.7	10.7	.697	.52	.10	.708
5	72.2	5.9	69.2	8.9	.708	.67	2.55	.750
6	72.2	4.0	70.2	6.0	.732	.95	1.71	.823
7	71.7	3.3	70.0	5.0	.727	.92	.39	.851
8	71.5	2.6	70.0	3.9	.727	.94	.07	.881
9	70.9	2.2	69.8	3.3	.722	.90	0.89	.899
10	70.4	2.0	69.4	3.0	.713	.81	.79	.908
11	69.8	2.1	68.7	3.2	.697	.64	.84	.901

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in
the month of November, 1854.*

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the sky.
		Inch.		
1	o 147.0		S.	Cloudless till 8 A. M. scattered ☉ till 4 P. M. Cloudless afterwards. Also fogs in the morning. [afterwards.
2	142.5		S. or S. W.	Cloudless till 9 A. M. scattered ☉ or ☿
3	141.5		S. or S. W.	Scattered ☿ or ☉ the whole day.
4	140.0		S.	Cloudless till 6 A. M. scattered ☉ till 3 P. M. Cloudless afterwards.
5	Sunday.	0.29		
6	..	..	S. or E. or N.	Scattered ☿ till 6 A. M. cloudy afterwards, also drizzling at 4 & 6 P. M.
7	..	0.28	N. or N. E.	Cloudy and constantly drizzling.
8	109.0	0.33	N. or N. W.	Cloudy till 6 P. M. and constantly drizzling before sun rise. Cloudless from 7 P. M. to midnight.
9	137.0		N. W.	Cloudless till 7 A. M. scattered ☿ till 6 P. M. Cloudless afterwards.
10	137.0		N. W.	Cloudless the whole day.
11	136.0		N. W. or W.	Ditto.
12	Sunday.			
13	139.0		W. or N. W.	Ditto. [afterwards.
14	140.2		N. W.	Scattered ☿ or ☉ till 4 P. M. Cloudless
15	140.0		N. W.	Scattered ☉ till 4 P. M. Cloudless afterwards. [afterwards.
16	136.0		N. W.	Cloudy more or less till 3 P. M. Cloudless
17	136.2		N. W.	Cloudless.
18	140.3		W. or N. W.	Ditto.
19	Sunday.			
20	136.0		W. or N. or N. W.	Ditto.
21	137.0		N. W. or N. high at 1 and 2 P. M.	Ditto.
22	135.0		N. or N. W.	Cloudless nearly the whole day.
23	120.0		N. or N. W.	Ditto.
24	135.9		N. or N. W.	Cloudless till 6 A. M. scattered ☿ till 5 P. M. Cloudless afterwards.
25	139.0		N. W. or N.	Cloudless till 4 A. M. scattered ☿ till 7 P. M. Cloudless afterwards.
26	Sunday.			
27	140.0		Calm or N. W.	Cloudless till 8 A. M. Various kinds of clouds afterwards.
28	142.4		N. W.	Cloudless till 5 A. M. scattered ☿ or ☉ till 1 P. M. Cloudless afterwards.
29	137.0		N. W.	Cloudless nearly the whole day.
30	135.0		N. W.	Ditto.

☿ Cirri, ☿ Cirro-strati, ☉ Cumuli, ☿ Cumulo-strati, ☿ Nimbi, — Strati,
☿ Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in
the month of December, 1854.*

Latitude 22° 33' 1" North, Longitude 88° 20' 34" East. .

Height of the Cistern of the Standard Barometer above the Level of the Sea 18.11. ^{feet}

Daily Means, &c. of the Observations, and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	30.033	30.144	29.987	0.157	73.5	79.9	65.8	14.1
2	.029	.108	.967	.141	72.8	81.0	66.5	14.5
3	<i>Sunday.</i>							
4	.032	.100	.995	.105	73.8	81.2	67.5	13.7
5	.066	.134	30.017	.117	71.9	79.2	65.4	13.8
6	.054	.140	.002	.138	69.6	77.4	63.0	14.4
7	.011	.082	29.952	.130	68.2	72.0	64.9	7.1
8	.000	.051	.966	.085	69.6	76.5	63.8	12.7
9	.018	.104	.963	.141	72.0	80.2	67.4	12.8
10	<i>Sunday.</i>							
11	.098	.173	30.048	.125	69.4	77.8	63.0	14.8
12	.105	.189	.039	.150	69.1	78.4	61.8	16.6
13	.109	.187	.065	.122	68.5	78.0	60.8	17.2
14	.070	.157	29.993	.164	68.3	77.0	61.2	15.8
15	.005	.075	.925	.150	68.5	78.0	61.2	16.8
16	29.986	.066	.937	.129	68.3	76.4	61.6	14.8
17	<i>Sunday.</i>							
18	30.044	.120	.987	.133	65.9	75.2	58.9	16.3
19	29.998	.088	.921	.167	67.0	76.4	59.7	16.7
20	30.016	.094	.965	.129	66.5	76.0	58.4	17.6
21	.027	.106	.979	.127	68.1	77.6	60.6	17.0
22	.023	.090	.961	.129	68.9	78.4	60.4	18.0
23	.010	.094	.947	.147	68.3	76.0	60.8	15.2
24	<i>Sunday.</i>							
25	<i>Christmas</i>							
26	29.995	.090	.943	.147	66.7	72.0	64.4	7.6
27	30.014	.102	.960	.142	67.9	78.2	60.3	17.9
28	.004	.088	.939	.149	67.1	77.0	59.4	17.6
29	29.988	.067	.925	.142	66.7	76.2	59.2	17.0
30	30.019	.110	.965	.145	66.5	77.4	58.8	18.6
31	<i>Sunday.</i>							

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in
the month of December, 1854.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional weight of vapour required for complete saturation.	Mean degree of Humidity complete saturation being unity.
1	68.6	3.9	66.6	5.9	Inches. 0.651	T. gr. 7.12	T. gr. 1.51	0.825
2	69.0	3.8	67.1	5.7	.661	.23	.48	.830
3	<i>Sunday.</i>							
4	68.7	4.1	66.6	6.2	.651	.12	.59	.817
5	67.3	4.6	65.0	6.9	.617	6.77	.71	.798
6	65.0	4.6	62.7	6.9	.572	.30	.60	.797
7	65.5	2.7	63.9	4.3	.595	.58	.00	.868
8	66.9	2.7	65.5	4.1	.628	.92	0.98	.876
9	67.9	4.1	65.8	6.2	.634	.96	1.54	.819
10	<i>Sunday.</i>							
11	64.5	4.9	62.0	7.4	.559	.16	.70	.784
12	63.9	5.2	61.3	7.8	.546	.02	.76	.774
13	63.3	5.2	60.7	7.8	.536	5.90	.75	.771
14	64.4	3.9	62.1	6.2	.561	6.19	.41	.814
15	64.4	4.1	62.3	6.2	.565	.23	.42	.814
16	63.4	4.9	60.5	7.8	.552	5.87	.73	.772
17	<i>Sunday.</i>							
18	61.4	4.5	58.7	7.2	.501	.56	.50	.787
19	62.6	4.4	60.0	7.0	.523	.79	.51	.793
20	62.4	4.1	59.9	6.6	.521	.77	.42	.803
21	64.1	4.0	61.7	6.4	.554	6.12	.43	.810
22	65.4	3.5	63.6	5.3	.590	.50	.24	.840
23	65.3	3.0	63.5	4.8	.588	.48	.12	.853
24	<i>Sunday.</i>							
25	<i>Christmas</i>							
26	64.4	2.3	63.0	3.7	.578	.49	0.83	.885
27	64.2	3.7	62.0	5.9	.559	.18	1.33	.823
28	62.6	4.5	59.9	7.2	.521	5.77	.55	.788
29	62.6	4.1	60.1	6.6	.525	.81	.42	.804
30	61.5	5.0	58.5	8.0	.498	.61	.66	.766
31	<i>Sunday.</i>							

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in the
month of December, 1854.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the Month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid-night.	30.034	30.111	29.980	0.131	65.4	69.7	61.6	8.1
1	.027	.105	.974	.131	64.8	69.0	61.0	8.0
2	.017	.104	.957	.147	64.3	68.5	60.9	7.6
3	.010	.096	.949	.147	63.6	68.2	60.5	7.7
4	.011	.077	.943	.134	63.4	67.9	60.0	7.9
5	.018	.088	.948	.140	62.8	68.0	59.0	9.0
6	.032	.167	.967	.140	62.5	67.8	58.8	9.0
7	.057	.150	.997	.153	62.2	67.5	58.4	9.1
8	.086	.172	30.033	.139	65.0	70.8	60.6	10.2
9	.107	.189	.047	.142	68.0	73.9	63.6	10.3
10	.107	.187	.051	.136	70.5	75.6	66.2	9.4
11	.088	.177	.041	.136	73.0	77.7	66.8	10.9
Noon.	.052	.131	.001	.130	75.1	79.8	66.0	13.8
1	.017	.100	29.970	.130	76.2	79.8	67.6	12.2
2	29.994	.072	.947	.125	77.1	81.2	70.4	10.8
3	.981	.065	.930	.135	77.1	80.4	71.6	8.8
4	.976	.068	.921	.147	75.0	78.5	71.0	7.5
5	.983	.078	.930	.148	73.7	76.8	70.4	6.4
6	.990	.085	.936	.149	71.8	75.5	68.6	6.9
7	30.009	.095	.958	.137	70.2	74.3	67.4	6.9
8	.024	.111	.956	.155	68.9	73.0	65.7	7.3
9	.035	.127	.914	.213	67.8	72.2	63.4	8.8
10	.042	.133	.989	.144	66.9	71.7	61.6	10.1
11	.039	.132	.985	.147	66.1	70.2	61.4	8.8

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in the
month of December, 1854.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Hour.	Mean Wet Bulb Thermo- meter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional Weight of Va- pour required for com- plete saturation.	Mean degree of Humidity complete saturation be- ing unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	63.2	2.2	61.9	3.5	0.557	6.18	0.77	0.889
1	62.7	2.1	61.4	3.4	.548	.10	.73	.893
2	62.4	1.9	61.1	3.2	.543	.04	.68	.899
3	61.6	2.0	60.2	3.4	.527	5.87	.70	.893
4	61.5	1.9	60.2	3.2	.527	.87	.66	.899
5	61.1	1.7	59.9	2.9	.521	.81	.60	.906
6	60.7	1.8	59.4	3.1	.513	.73	.62	.902
7	60.6	1.6	59.5	2.7	.515	.75	.54	.914
8	62.4	2.6	60.8	4.2	.537	.97	.90	.869
9	64.2	3.8	61.9	6.1	.557	6.16	1.37	.818
10	65.5	5.0	63.0	7.5	.578	.35	.78	.781
11	66.9	6.1	63.8	9.2	.593	.49	2.27	.741
Noon.	67.8	7.3	64.1	11.0	.599	.52	.82	.698
1	68.2	8.0	64.2	12.0	.601	.53	3.13	.676
2	68.6	8.5	64.3	12.8	.603	.55	.37	.660
3	68.6	8.5	64.3	12.8	.603	.55	.37	.660
4	67.5	7.5	63.7	11.3	.591	.45	.86	.693
5	67.5	6.2	64.4	9.3	.605	.62	2.34	.739
6	67.2	4.6	64.9	6.9	.615	.75	1.70	.799
7	66.6	3.6	64.8	5.4	.613	.76	.29	.840
8	65.9	3.0	64.4	4.5	.605	.67	.07	.862
9	65.1	2.7	63.5	4.3	.588	.50	0.98	.869
10	64.4	2.5	62.9	4.0	.576	.38	.90	.876
11	63.8	2.3	62.4	3.7	.567	.28	.82	.885

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in the
month of December, 1854.*

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the sky.
	o	Inches.		
1	130.0		N. W. or N.	Cloudless till 6 A. M. scattered ☁ or other clouds afterwards.
2	136.0		Calm or N. E. or N. W. or N.	Cloudless till 10 A. M. scattered ☁ till 3 P. M. cloudless afterwards and foggy after sunset.
3 <i>Sunday.</i>				
4	136.0		N. or N. W.	Scattered ☁ till 10 A. M. nearly cloudless afterwards.
5	137.2		N. or N. W.	Cloudless till 5 P. M. scattered ☁ afterwards.
6	129.7		N. W. or N.	Cloudless till 9 A. M. scattered ☁ till 7 P. M. cloudless afterwards.
7	..		W. or N. or N. W.	Various clouds.
8	..		N. W. or calm.	Scattered ☁ or cloudy the whole day.
9	138.0		W. or N.	Cloudy till 10 A. M. cloudless afterwards.
10 <i>Sunday.</i>				
11	135.6		N. or N. W.	Cloudless.
12	134.9		N. W.	Ditto.
13	135.0		N. W.	Ditto.
14	134.8		W. or N. W.	Ditto.
15	131.0		N. W.	Cloudless till Noon scattered ☁ or ☁ till 8 P. M. cloudless afterwards.
16	132.0		N. W. or W.	Cloudless till 5 P. M. scattered ☁ till 7 P. M. cloudless afterwards.
17 <i>Sunday.</i>				
18	125.0		N. W.	Cloudless.
19	133.8		N. W.	Cloudless till Noon scattered ☁ till 7 P. M. cloudless afterwards.
20	133.0		Calm or N. W.	Cloudless till 6 A. M. scattered ☁ till 6 P. M. cloudless afterwards and also foggy.
21	132.0		N. W. or N.	Cloudless.
22	137.0		N.	Ditto.
23	127.0		N. or N. W.	Cloudless till 7 A. M. scattered ☁ or ☁ afterwards.
24 <i>Sunday.</i>				
25 <i>Christ-</i>				
26 <i>mas.</i>				
26	..		W. or N. W.	Cloudy till 3 P. M. and drizzling at Noon cloudless afterwards.
27	137.0		N. W. or N.	Cloudless.
28	135.5		N. or N. W.	Ditto.
29	131.0		Calm or N. W.	Ditto.
30	139.0		W. or N. or N. W.	Ditto.
31 <i>Sunday.</i>				

☁ Cirri, ☁ Cirro-strati, ☁ Cumuli, ☁ Cumulo-strati, ☁ Nimbi, ☁ Strati,
☁ Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in the
month of January, 1855.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the cistern of the Standard Barometer above the level of the Sea, 18.11, ^{feet}

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahrt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	°	o	o
1	New year's day.							
2	29.986	30.066	29.924	0.142	66.2	76.6	58.4	18.2
3	30.002	.080	.953	.127	65.8	73.6	59.2	14.4
4	.016	.100	.960	.140	68.3	77.6	62.6	15.0
5	.028	.115	.968	.147	68.8	78.8	61.6	17.2
6	29.975	.075	.889	.187	70.2	77.8	63.8	14.0
7	Sunday.							
8	.881	29.937	.846	.091	66.3	71.2	62.7	8.5
9	.915	.989	.864	.125	66.6	76.0	59.0	17.0
10	.875	.959	.802	.157	69.5	79.6	60.4	19.2
11	.893	.993	.836	.157	69.6	75.7	65.0	10.7
12	.950	30.019	.912	.107	68.3	76.6	61.6	15.0
13	.960	.044	.907	.137	67.4	75.4	60.4	15.0
14	Sunday.							
15	30.035	.118	.954	.164	66.8	75.2	61.4	13.8
16	.065	.157	30.011	.146	64.3	74.8	55.8	19.0
17	.066	.152	.017	.135	64.6	75.2	55.7	19.5
18	.046	.125	.006	.119	65.9	76.3	57.0	19.3
19	.073	.155	.020	.135	68.9	77.0	62.6	14.4
20	.117	.219	.070	.149	65.1	74.0	58.8	15.2
21	Sunday.							
22	.029	.112	29.954	.158	61.4	72.8	52.2	20.6
23	.036	.127	.981	.146	63.0	73.8	54.4	19.4
24	.042	.132	.966	.166	62.6	73.8	53.7	20.1
25	29.994	.067	.917	.150	64.5	75.8	55.0	20.8
26	30.024	.092	.966	.126	66.7	78.6	54.8	22.8
27	.058	.143	.989	.155	68.9	79.8	59.4	20.4
28	Sunday.							
29	.105	.180	30.046	.134	67.8	77.8	59.0	18.8
30	.153	.249	.081	.168	66.1	77.2	57.0	20.2
31	.138	.221	.076	.145	65.3	76.4	56.0	20.4

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in the
month of January, 1855.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Va- pour required for com- plete saturation.	Mean degree of Humi- dity, completeatura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	New year's day.							
2	62.5	3.7	60.3	5.9	0.528	5.86	1.26	0.823
3	62.0	3.8	59.7	6.1	.518	.75	.29	.817
4	63.8	4.5	61.1	7.2	.543	.99	.61	.788
5	65.4	3.4	63.7	5.1	.581	6.52	.19	.846
6	66.2	4.0	64.2	6.0	.601	.61	.44	.821
7	Sunday.							
8	64.5	1.8	63.4	2.9	.586	.49	0.66	.908
9	63.6	3.0	61.8	4.8	.555	.15	1.06	.853
10	66.3	3.2	64.7	4.8	.611	.73	.15	.854
11	65.5	4.1	63.4	6.2	.586	.45	.46	.816
12	63.0	5.3	59.8	8.5	.520	5.73	.87	.754
13	62.2	5.2	59.1	8.3	.508	.62	.77	.760
14	Sunday.							
15	61.9	4.9	59.0	7.8	.506	.60	.66	.771
16	58.8	5.5	54.9	9.4	.441	4.91	.81	.731
17	58.9	5.7	55.5	9.1	.450	5.01	.77	.739
18	60.2	5.7	56.8	9.1	.470	.21	.85	.738
19	63.1	5.8	60.2	8.7	.527	.80	.94	.745
20	58.7	6.4	54.9	10.2	.441	4.90	.99	.711
21	Sunday.							
22	56.0	5.4	51.7	9.7	.396	.43	.71	.721
23	57.1	5.9	53.0	10.0	.414	.62	.83	.716
24	58.0	4.6	54.8	7.8	.440	.90	.47	.769
25	59.3	5.2	56.2	8.3	.461	5.13	.63	.759
26	61.3	5.4	58.1	8.6	.491	.43	.80	.751
27	63.4	5.5	60.6	8.3	.534	.88	.86	.760
28	Sunday.							
29	61.6	6.2	57.9	9.9	.488	.38	2.10	.719
30	59.6	6.5	55.7	10.4	.453	.03	.07	.708
31	59.8	5.5	56.5	8.8	.465	.17	1.76	.746

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in the
month of January, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid-night.	30.015	30.162	29.849	0.313	62.8	70.4	56.6	13.8
1	.008	.159	.847	.312	62.1	70.4	56.0	14.4
2	29.999	.152	.839	.313	61.5	70.0	55.3	14.7
3	.989	.143	.836	.307	60.8	69.4	54.4	15.0
4	.986	.134	.844	.290	60.2	68.2	53.6	14.6
5	.995	.145	.852	.293	59.6	66.1	53.0	13.1
6	30.011	.151	.864	.287	59.3	65.8	52.4	13.4
7	.036	.165	.889	.276	59.0	65.0	52.2	12.8
8	.066	.200	.910	.290	61.0	65.2	55.0	10.2
9	.092	.231	.935	.296	64.6	68.9	59.8	9.1
10	.100	.249	.937	.312	67.9	72.0	61.8	10.2
11	.086	.232	.931	.301	70.7	74.6	65.0	9.6
Noon.	.055	.202	.889	.313	73.2	76.8	68.8	8.0
1	.019	.166	.849	.317	74.7	78.6	70.6	8.0
2	29.993	.134	.833	.301	75.6	79.4	70.8	8.6
3	.975	.098	.808	.290	75.8	79.8	71.2	8.6
4	.965	.091	.802	.289	74.0	78.0	70.2	7.8
5	.969	.084	.812	.272	72.5	76.6	69.8	6.8
6	.975	.081	.821	.260	70.3	74.1	66.6	7.5
7	.992	.111	.829	.282	68.6	72.3	64.2	8.1
8	30.010	.128	.845	.283	67.1	71.4	62.7	8.7
9	.025	.145	.854	.291	65.8	70.8	61.2	9.6
10	.034	.151	.858	.293	64.7	70.6	59.6	11.0
11	.029	.158	.848	.310	63.8	70.5	57.7	12.8

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in the
Month of January, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Hour.	Mean Wet Bulb Thermo- meter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional weight of va- pour required for com- plete saturation.	Mean degree of Humidity, complete saturation be- ing unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	60.5	2.3	58.9	3.9	0.504	5.62	0.79	0.877
1	60.0	2.1	58.5	3.6	.498	.56	.71	.887
2	59.5	2.0	58.1	3.4	.491	.50	.66	.893
3	58.8	2.0	57.2	3.6	.476	.33	.69	.865
4	58.1	2.1	56.4	3.8	.464	.20	.71	.880
5	57.7	1.9	56.2	3.4	.461	.18	.62	.893
6	57.4	1.9	55.9	3.4	.456	.13	.61	.894
7	56.9	2.1	55.2	3.8	.445	.01	.68	.880
8	58.4	2.6	56.3	4.7	.462	.18	.88	.875
9	60.1	4.5	57.4	7.2	.480	.33	1.45	.786
10	61.6	6.3	57.8	10.1	.486	.37	2.14	.715
11	62.9	7.8	59.0	11.7	.506	.55	.63	.678
Noon.	64.3	8.9	59.8	13.4	.520	.68	3.14	.644
1	65.1	9.6	60.3	14.4	.528	.76	.47	.624
2	65.8	9.8	60.9	14.7	.539	.86	.62	.618
3	65.9	9.9	60.9	14.9	.539	.86	.68	.614
4	64.9	9.1	60.3	13.7	.528	.76	.28	.637
5	64.5	8.0	60.5	12.0	.532	.83	2.80	.676
6	64.6	5.7	61.7	8.6	.554	6.08	.00	.752
7	64.0	4.6	61.7	6.9	.554	.10	1.57	.795
8	63.1	4.0	60.7	6.4	.536	5.93	.39	.810
9	62.4	3.4	60.4	5.4	.530	.89	.15	.837
10	61.7	3.0	59.9	4.8	.521	.79	.01	.851
11	61.3	2.5	59.5	4.3	.515	.73	0.88	.867

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta, in
the month of January, 1855.
Solar radiation, Weather, &c.*

Data.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the Sky.
	o	Inches.		
1	New year's day.			
2	134.0	..	N. or N. N. W. or N. W.	Cloudless and fogs in the morning and evening. [afterwards.
3	123.0	..	Calm or N. W.	Cloudless till 5 A. M. clear or less cloudy
4	125.2	..	N. or N. W. or S. W.	Cloudy till 7 A. M. scattered \-i afterwards. [afterwards.
5	135.7	..	W. or S. W.	Various clouds till 10 A. M. cloudless
6	128.0	..	Calm or S. or S. E.	Cloudless till 5 A. M. scattered \-i or \-i till 6 P. M. cloudy afterwards. [terwards.
7	Sunday.			
8	111.0	0.46	S. E. or N. W.	Various clouds till 5 P. M. cloudless af-
9	134.8	..	W. or N. N. W. or N. W.	Cloudless till 10 A. M. scattered \-i till 4 P. M. cloudless afterwards.
10	137.0	..	N. W. or S. or S. W.	Cloudless till 9 A. M. scattered \-i or \-i till 3 P. M. cloudless afterwards.
11	131.0	..	N. W. or S. W.	Scattered \-i till 11 A. M. cloudless afterwards.
12	135.0	..	Calm or N. W.	Scattered \-i till 6 A. M. cloudless till 3 P. M. scattered clouds afterwards.
13	131.7	..	N. or N. E.	More or less cloudy the whole day.
14	Sunday.			
15	133.8	..	N. or N. W. or N. N. W.	Various clouds till 11 A. M. cloudless afterwards.
16	133.0	..	N. or N. W.	Cloudless.
17	134.0	..	N. W. or N. E. or N. N. W.	ditto.
18	133.0	..	N.	Cloudless till 5 A. M. scattered \-i till 10 A. M. cloudless till 2 P. M. cloudy afterwards
19	133.0	..	N. W.	Various clouds the whole day.
20	134.0	..	N. or N. W.	Cloudless till 10 A. M. scattered \-i and \-i till 3 P. M. cloudless afterwards.
21	Sunday.			
22	129.0	..	Calm or N. N. W. or W.	Cloudless.
23	133.0	..	W. or N. W.	Cloudless till Noon, scattered \-i till 6 P. M. cloudless afterwards.
24	131.0	..	N. W.	Cloudless till 5 A. M. scattered \-i till 7 P. M. cloudless afterwards.
25	129.8	..	W. or S. W.	Cloudless nearly the whole day. [night.
26	135.0	..	Calm or S. W.	Cloudless and slightly foggy during the
27	139.0	..	Calm or N. W. or S.	Cloudless.
28	Sunday			
29	136.2	..	W. or N. or N. W.	Cloudless till 7 A. M. scattered \-i or \-i till 3 P. M. cloudless afterwards. [day.
30	134.5	..	N. or W. or N. W.	Cloudless and slightly foggy during the
31	131.5	..	W. or N. N. W. or N. W.	Cloudless and slightly foggy in the morning and evening.

\-i Cirri, \-i Cirro-strati, \-i Camali, \-i Camulo-strati, \-i Nimbi, \-i Strati, \-i Cirro-nebuli.

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No. IV.—1855.

Examination and Analysis of a Coal from Oherra Punji, received from Messrs. GILMORE and McKILLIGAN.—By H. PIDDINGTON, Esq. Curator, Museum of Economic Geology.

This coal is, on one fracture, a fine bright glance coal. On the cross fracture it is hackly and resinous, and wherever faint lines of stratification can be traced they are again crossed by lines almost perpendicular, though the coal shows no tendency in its fragments to divide cubically, but rather in beds and thick laminæ.

When either the powdered or solid coal are exposed to heat in a closed crucible, it is found that they swell up in coking to a curious bright black puffy and froth-like mass, which fills the whole crucible, and is exceedingly tender and brittle. This singularity distinguishes it from all other coal, of which we have any record available here.

It crackles and flies a little in the forceps, and then flames, and burns up in long gas-like jets.

The smell of the smoke is that of good Newcastle coal, and has nothing disagreeable or peaty about it.

Its Sp. gravity is,	1.24
Its constituent parts are,	
Water,	00.85
Gaseous matter,	66.00
Carbon,	82.65
Ash (dark grey),	00.50
	100.00

It would thus appear, so far as laboratory experiment can guide us, that this coal is a first rate gas coal, but would not give a coke applicable to any present known use, the coke being in fact a black carbonaceous froth.

As a steam coal, unless it be perhaps with tubular boilers, it would not be found an economical one; as though from its rapid flaming, the steam would be quickly raised, yet from the large proportion of gas, much of it would be unconsumed, and driven up the funnel or chimney, and the proportion of carbon (coke) is too small to keep up a long steady glowing heat, without a fresh supply of coal. If it is used for steam in common furnaces, the most economical method of using it, would probably be to burn two-thirds of Burdwan or other inferior coal to one of this kind.

On communication of these results to Messrs. Gilmore and McKilligan, they shewed me a report from Mr. Ward of Messrs. Jessop & Co. stating that they had found that the coal coked well! Supposing some error, I repeated my own experiment, and obtained from Mr. Ward some of their coal, and of its coke, which was very fine and the coal evidently from the same seam; but upon trying some of it in the same (silver) crucible over a lamp furnace, it produced only the puffy mass, like my former result. I called on Messrs. Jessop to compare notes, and they informed me that from 2 maunds 35 seers of the coal, they had obtained but one maund of coke, or rather less, since it was weighed when damp. This is very nearly our proportion of 33 per cent of carbon and ash, for $100 : 33 :: 115 : 37.78$, which was about the true weight of Messrs. Jessop's coke.

The singular fact, however which it teaches us, i. e. that with highly gaseous coal, the same result is not produced on a small scale as on a large one, is highly interesting; and thinking it might be owing to the too sudden application of heat, from the lamp furnace heating the silver crucible quickly to redness, I tried graduating the heat very slowly but without success; so that this is not the cause of this extraordinary difference of results.

*Description of a new species of Hornbill, by Capt. S. B. TICKELL,
Principal Asst. Commr. Tenasserim provinces.*

BUCEROS [TICKELLI, Blyth].

Sex—Female, nearly adult? Eastern base of Dauna hills. District of Amherst, Tenasserim provinces.

Dimensions.—Length $22\frac{1}{2}$ in.; spread 31 in.; wing 1 in.; tail $11\frac{1}{2}$ in. (beyond wing $7\frac{1}{2}$ in.); bill $4\frac{2}{5}$ in.; tarsus $1\frac{1}{2}$ in.; m. toe $1\frac{1}{2}$ in.; greatest vertical depth of bill and casque 2 in.

Details.—Bill resembles with its casque the bill and casque of young *B. BIROSTRIS*. Edges serrated as if eroded, but meeting throughout the length of bill. Casque compressed into a keel-like process, rising rather abruptly from the forehead, and then inclining downwards and forwards with the arch of the bill, with which it amalgamates at about 2 in. from top. Nostrils opening upwards, and pierced in a flattened ridge. Chin and throat feathered except close to bill. Tail pretty long and rounded, centre exceeding outer feather by $1\frac{1}{2}$. For the rest the details are typical, the form and proportions resembling those of *B. BIROSTRIS*, the common “Dhunnès” of India.

Colour.—(Female.) Iris grey, with an inner circle of brown. Bill dark horn, basal half of casque dull orange: orbits nude and dull pale smalt-blue. Legs dark greenish-horn, with pale soles. Head and its blunt occipital crest bistre-brown, the feathers shaftally pale. Upper-parts umbre-brown, dull and opaque, with a slight tinge of olive, and glances of dull green in certain lights. On the remiges this colour darkens, the secondaries and primaries being greenish-black, the latter with their outer margins midway and their tops whitish. Tail, 2 centre feathers as back, with pale tips: the rest greenish black with pale tips. All under-parts rufescent-tawny, brightest on throat, dull and clouded with vinous-ashy below. Auriculars striated bistre, as are sides of neck obscurely. Lining of wings dusky and tawny.

From the written description of the casque and bill of *BUCEROS GALERITUS* (*Journal As. Soc.* for 1845, No. 159, p. 187), I was led to identify the present subject with that species, but am assured

by Mr. Blyth that they differ. The species now under review is therefore new to science.

The district of Amherst (Tenasserim provinces) is traversed for its whole length, north and south, by a continuation of the Yoma-doung or south-eastern Himalaya. This range continues southward through Tavoy and Mergui, and forms finally the backbone of the Malayan peninsula. And along these mountains birds supposed to be peculiar to the peninsula and the Straits on the one side, and restricted to Nepal and the Morung and Terai on the other, are frequently met with. The range (or ranges) in Amherst are about forty miles in breadth (though the mountainous portion of the province seems to dilate as extending southward), and the ridges are for the most part excessively steep, and buried in forests: but rising to more scantily clothed peaks of 7 or 8000 feet elevation. On the lower skirting hills, but especially on the plains at their feet, the soil, watered by numerous brooks and streams, is exceedingly rich, and nourishes trees of prodigious dimensions. The "Thengan" (*Hopea* tree, apud Judson), "Toung-bing," and "Kathy-kha" (trees used by the Talyns for making boats of upwards of 50 tons burden), rise to 150 ft. before producing a branch, their summits attaining a height of 230 feet and upwards; and it is on these giants of the forest that this species of Hornbill reposes and feeds, never being met with in jungle where the trees are of an ordinary size. I met with these birds from the plains up to an elevation of 3,500 or 4,000 ft. above the sea, but not beyond; and they appeared commonest on the easterly skirts of the range, keeping together in pairs or small parties of five and six, incessantly calling to each other in loud plaintive screams "*whé-whéyo, whé-whéyo*," and when feeding, keeping up a low murmuring cackle like Parrots. Their flight is smooth and regular like that of *BUCEROS PUSARAN*, not in alternate flaps and sails like *B. CAVATUS*, or *ALBIBOSTRIS*, or *BIBOSTRIS*. And it is performed at great elevations especially when they cross from top to top of the mountains. Keeping ever thus at immense heights, and being withal as quick-sighted and wary as the rest of the genus, it may be pronounced one of the most difficult birds in the world to be procured with a gun. It is, therefore, no matter of wonder, that although large collections of birds have been made in the Tenas-

serim provinces, this Hornbill has never hitherto formed part of them. Amongst the individuals I could see, but not shoot, some were apparently entirely black, and these may be the adult males. The wild Karens who lived nearest to those uninhabited forests knew nothing of the bird.

On a simple method of Manipulation in the Calotype process.—By
J. J. GRAY, Esq. Maldah.

In the description of the following process I make no claim to originality, it being merely an adaptation of Fox Talbot's process to suit the requirements of an Indian climate, the mode of manipulation being so simplified that, with ordinary care, failure will be impossible.

Paper.—I prefer Turner's negative calotype paper to all others I have tried.

Iodizing.—I always iodize by the single-wash process, sometimes first washing the paper with a solution of chloride of barium, 12 grains to the ounce of distilled water. I have also used bromide of potassium, but cannot say that I have noticed any particular benefit from its use.

To iodize the paper, the following articles are required :

A sheet of "solah," cork, or soft wood, larger than the paper to be iodized.

A double fold of clean flannel, or sheets of clean blotting paper.

Silver pins, which can be made in any bazar.

A couple of Buckle's brushes, or, what is quite as good, the neck of an Eau de Cologne bottle, with some cotton-wool and a bit of thick thread.

A couple of large dishes, or trays, of glass, wedge-wood ware, or gutta purcha filled with water.

The iodizing solution.—To make which, I quote Dr. Diamond in the 11th No. of the Journal of the London Photographic Society.

Take sixty grains of nitrate of silver, and sixty grains of iodide of potassium, dissolve each separately in an ounce of distilled water, mix and stir briskly with a glass and so as to ensure their perfect mixture; the precipitated iodide of silver will fall to the bottom

of the vessel; pour off the fluid, wash once with a little distilled water, and add 650 grains of iodide of potassium, which should perfectly re-dissolve the silver and leave a clear fluid; should it not (for chemicals differ occasionally in purity) then a little more should be added, until the effect is produced.

Select the sheets to be iodized, carefully rejecting those in the slightest degree damaged or defective; mark the smoothest side with a pencil in one corner, lay the flannel or blotting paper on the solah board, lay the paper marked side uppermost on the flannel and pin it down at the four corners with the silver pins; now dip the cotton brush into the iodizing solution, incline the board and commencing at the top of the sheet; lay on the wash with a steady hand as in laying on a flat tint in water colour painting, taking care that none of the liquid runs, turn the board, and cross the first wash with a second at right angles being careful to obliterate all air bubbles and not to leave an excess of liquid, so as to pool when laid on its back; unpin and lay the sheet on its back on any clean flat surface to dry. Commence upon a second sheet and so on until the requisite number are finished, which depends upon the depth of the dishes used for washing; before the sheets are perfectly dry immerse them carefully in dish No. 1, putting them in one by one, and getting rid of air bubbles by blowing, gently agitate the dish for a few minutes, then change separately to dish No. 2, repeat the agitation, re-fill No. 1, with clean water and shift back the papers, and so on changing the water half a dozen times or until the dripping from the sheet cause no precipitate in a solution of nitrate of silver. I generally find from four to six changes in an hour suffice. The sheets should now be of a pale primrose colour of an even tint on the face, with scarcely any trace of colour on the back.

They are now to be lifted out separately and hung up to dry, pins are apt to tear large sheets, the best plan is to throw them across a wooden rail over which sheets of any clean paper, covered with clean towels have been hung. When dry, they can be put away in a portfolio for use. The whole of this operation may be performed in moderate daylight, and the dry paper may be exposed to the full force of the sun with benefit.

To Excite.—I here diminish the strength of the exciting solution as the heat of the weather increases.

The normal solutions are as follows:—

No. 1.

Nitrate of silver,	30 grains.
Glacial acetic acid,	1 drachm.
Distilled water,	1 ounce.

No. 2.

Gallic acid,	10 grains.
Glacial acetic acid,	$\frac{1}{2}$ drachm.
Distilled water,	6 ounces.

The addition of the acetic acid enables us to keep the gallic acid any length of time without decomposition.

Take 10 minims of No. 1 and 10 minims of No. 2 mixed with 3 drachms of distilled water (this is just enough for a sheet 10 by 12 inches) pin the iodized paper face upwards on the solah board as before with clear silver pins, dip a clear Buckle brush in the gallo-nitrate solution, and lay on the wash as described in the iodizing process, lay the board on its back out of the light of the candle for about a minute, then unpin the paper take it up by a couple of corners, and lay it carefully, face downwards, on a dish of clean filtered water, taking care not to wet the back; agitate the dish gently for a few minutes, lift up the paper, allow it to drain for a few seconds and lay it on its back on a clean dry surface, blot off with a fresh sheet of blotting paper, and put it, while still damp, in the dark frame. With a little management, four sheets can easily be thus excited at one time.

If the weather is warm, reduce the quantity of gallic acid to 4 minims.

If the weather is hot, omit the gallic acid altogether, and a second washing may be given to the paper, if it is required to keep long.

Exposure.—It is impossible to give any safe guide in this part of the process as no two lenses work alike. The shortest exposure I give is 3 minutes, and I have given as much as 15 according to the light.

Development.—Here again I graduate the strength of the solution according to the heat of the weather, or the appearance of the paper when taken out of the dark frame.

In cool weather, and when no trace of the picture is visible on the paper, I use equal parts of the aceto-nitrate and gallic acid as in the normal solution.

As the weather gets warmer or the picture appears more or less on the paper, I decrease the quantity of aceto-nitrate, substituting the gallic acid. This developing solution is laid on exactly as in exciting with a clean cotton brush, the paper being kept wet until the development is complete, and the minutest detail visible. Then unpin the paper and wash in a couple of waters in a dish, after which it may be put into the hypo-sulphate of soda solution (1 oz. to 6 oz. of clean water) and taken into the light. When the picture has lost all trace of the yellow iodide of silver it is fixed and must be immediately washed in many waters for several hours, dried, and finally waxed for the printing process.

Let me add a few cautions to beginners. In iodizing, be careful that the fingers are free from nitrate of silver stains ; I have spoiled a whole batch of papers by neglecting this.

See that not a trace of daylight is admitted into the operating-room the single candle even must be shaded, the light may be allowed to come through the window however, if guarded by a double fold of American sheeting dyed with the wood of the jack-tree.

Should the paper turn brown in spite of all precautions, be assured the glacial acetic acid is too weak ; therefore increase the quantity.

Carefully wash out all the vessels used, more especially those in which the gallo-nitrate has been mixed.

Keep the hypo-sulphate of soda at a distance from all the other chemicals, and set separate dishes aside for its use, two solutions will serve to fix many proofs if filtered before use, even after it has become quite black.

A clean flock of cotton-wool must be used for each picture, and for each purpose in the Buckle brush.

I think that the above reduces the calotype process to a simplicity, which can hardly be exceeded : it is also an exceedingly economical one, a matter of no small importance in India, where chemicals are often not to be had, and are sold at such extravagant prices.

Gray considers to be a S. African variety of *H. STRIATA*, Zimmerman, the common Striped Hyæna of Asia and N. Africa. We have seen *H. VILLOSA* alive, and have minutely compared its skull with skulls of the Spotted and of the Striped Hyænas; and arrived at the conclusion that it was a distinct species, nearly affined to *H. STRIATA*, but with the solitary true molar less developed, though more so than in *H. CROCUTA*.* Dr. Gray even institutes a genus *CROCUTA*, to which he refers as species *CR. MACULATA* (*Canis orocuta*, Erxleben, *Hyæna maculata*, Humb., v. *H. capensis*, Desmarest), the ordinary Spotted Hyæna, and *CR. BRUNNEA* (with synonymes as before cited). The Somáli animal is probably the latter. The specimen is a female. "The Somáli call it *Waraba*, ورابا, or *Durwa*, دروا. It is common to all the Somáli country, whines about the camp all night, and devours anything it can find during the day, pulling down camels and even children. The natives have many superstitions about this animal, and you often hear of a man being called *Waraba* after his proper name; the idea being that by rubbing certain plants over the body the magician can convert himself like Mars into a Wolf. In the cold season when the *Waraba* is hungry he attacks man. The Somális all declare this animal to be a hermaphrodite, copulating and being copulated with alternately." (*Vide* Pliny, VIII, 30; as cited by Cuvier, *Oss. Foss.* VII, 812, 4th edit.)

* *MUNGOS FASCIATUS*; *Herpestes fasciatus*, Desmarest: *Viverra mungo*, Kämpfer; *V. ichneumon*, Schreber (from Buffon, III, t. 19); *H. zebra*, Ruppell; *Ryzæna suricata* apud Children, 'Appendix to Clapperton's Travels'). "Called the *Kadaf*, كداف. These animals run about in large batches, and defend themselves savagely when wounded. They inhabit the plateau, burrow deep, and when pursued endeavour to escape by hiding themselves: yet with characteristic curiosity, they must peep out of their asylum after a few minutes' concealment."

FELIS CARACAL, Schreber. "Called by the Somális *Jumbil*, جبيل. It is principally found in the plains."

* *XERUS RUTILANS*; *Sciurus rutilans*, Ruppell: *X. brachyotus*, Hemprich and Ehrenberg, apud Gray "Ground Squirrel, called *Dabakálla*, دباكلا. It abounds all over the country, burrows especially

* *Vide also* Cuvier, *Oss. Foss.* VII, 319 (4th edit.)

into deserted ant-hills, and under dead trees. The testes of the male are enormous; and the colour of the coat is glossy and brilliant."

*PECTINATOR (*n. g.*) SPEKEL, nobis, *n. s.* "Common Rat. *Barabbul*, برابابل. Inhabits stony ground, like the HYRAX." This highly interesting rodent belongs to a peculiar N. African group, of which one species only appears hitherto to be tolerably known, the CTENODACTYLUS MASSONII, Gray.* The animals of this group are clad with delicately soft fur, have very long moustaches, and four toes only on each foot. The palms and soles are naked, the latter to the heel or tarsal joint; and the entire length of the tarse is brought to the ground when walking. Over each claw is a curving tuft of stiffish bristles, more conspicuously developed on the hind-feet; and the innermost toe of the hind-foot has a peculiar combing apparatus, which has been described by Mr. Yarrell in the instance of CTENODACTYLUS MASSONII. "With this comb-like instrument," remarks that naturalist, "the little animals were observed [in the London Zoological Garden] to be continually dressing their soft fur; and the facility with which they managed to reach every part of each lateral half with the toe of the foot

* Vide a notice of the anatomy of this animal, by Mr. Yarrell, in *Proc. Zool. Soc.* 1831, p. 49. A second species would seem to exist in the *Mus gundi*, Rothman, or *Gundi Marmot* of Pennant's 'Zoology;' which, being described to be of the "size of a small Rabbit," and of a "testaceous-red colour," can scarcely (as remarked by Dr Gray) be specifically identical with Ct. MASSONII, even though from the same country—Barbary. The fur of Ct. MASSONII is pale yellowish-brown; and its tail is described by Mr. Yarrell to be 1 in. long. The *Gundi* is merely stated to have a "short tail." Accordingly, the following (obviously another of the same group and region), with rudimentary tail "but just perceptible to the touch," is probably a third species, which was observed by Capt. Lyon in the mountains north of Tripoli. That traveller informs us, that—"It much resembles a Guinea-pig in form, but is of a light brown mouse-colour. Fur longer than that of a Rat, and very silky; eyes black, large, and prominent. Orifices of ears, which are quite flat against the sides of the head, also black, and free from hair: the tail, or rather a little stump in place of one, is just perceptible by the touch, and from it grows a tuft or bunch of long black hairs. The body is very round and fat, and particularly broad at the shoulders. These animals burrow amongst the rocks. They are eaten with great relish by the natives, and no doubt are very good, as the flesh is exceedingly white and fat, and resembles that of a Rabbit." 'Travels in Barbary,' p. 32.

Report on a Zoological collection from the Somáli country.—By
E. BLYTH.

The collection on which I have now the honor to report was made by Lt. Speke, of the 46th B. N. I., and was forwarded to the Society's Museum by Lt. Burton of the Bombay Service, in command of an expedition into the Somáli territory, or African region bordering on the Red Sea.*

This collection comprises 10 species of mammalia, 36 of birds, 3 of reptiles, 1 fish, a scorpion, and 3 species of *Coleoptera*. The whole of the *Vertebrata* (if not the rest also) being distinct species from any found in this country; save only a *Lynx* (*FELIS CARACAL*), and a Wheatear (*SAXICOLA MELANURA*, Temminck), which latter is figured among the Burnes' drawings from Sindh, though we did not previously possess an example of the species.

The actual novelties are not many; but comprise a highly interesting rodent, in a new generic form affined to the hitherto isolated African genus *CTENODACTYLUS*, Gray; and among the birds, a second species of the *Sturnidous* genus *SPEO*, a handsome undescribed true Sparrow, and a small Floriken remarkable for the shortness of its tarsi. There is also a *Sturnidous* bird, which is probably the *LAMPROTORNIS MORIO* apud Rüppell; but is quite distinct from the species so denominated of S. Africa, from which it is now probably first distinguished.† A *Bayá* (or 'Weaver-bird') sent would seem to be the long lost *Baglefecht* of Buffon, which the older systematists confounded with our Indian *POCEUS PHILIPPINUS*, and in Griffith's edition of Cuvier's 'Animal Kingdom' is placed as a synonyme of *EUPLECTES ABYSSINICUS*: and a beautiful small Honey sucker (*NECTARINIA ALBIVENTRIS*, Strickland, described from the Somáli country,) is now probably only for the second time received in any collection. The reptiles comprise an apparently new Scinque.

* *Vide* p. 245, *ante*.

† Since the above was written, we find (from a recent No. of the *Comptes Rendus*) that this Abyssinian bird has lately been discriminated by M. Verreaux, who terms it *AMYDRUS RUFFELLI*.

With the exceptions of *FELIS CARACAL* and *OXYLOPHUS GLANDARIUS*, the whole of the species would have been new to the Society's museum, had we not just previously received the collection from Dr. Rüppell noticed in my Report for April of this year;* and which supplied us with examples of *CANIS VARIEGATUS*, *DENDROBATES ÆTHIOPICUS*, *SAXICOLA ISABELLINA* (?), *PLATYSTEIRA SENEGALENSIS*, *NECTARINIA HABESSINICA*, and *PTEROCLES SENEGALENSIS*: but in all of these instances the examples prepared by Lt. Speke are finer, and he has favoured us with both sexes of the *PTEROCLES*.

As acquisitions of especial interest may be indicated the *HYÆNA*, the Abyssinian *HYRAX*, the little Salt's Antelope (a particularly fine and well prepared specimen), and the new rodent; and among birds the *Bateleur* Eagle, the Hornbill, two species of *PROMEROPS* (a genus intermediate to *BUCEROS* and *UPUPA*), the *CHIZERIS*, *CORVI*, *BUPHAGA*, *LANIARIUS CRUENTUS*, *HYPHANTORNIS BAGLEFECHE*, the *RASORES*, new Floriken, and *CHENALOPEX* or 'Egyptian Goose,' of which common African bird we did not previously possess a specimen.

In proceeding to details, we distinguish by inverted commas some notes obligingly supplied by Lt. Burton.

MAMMALIA.

CANIS VARIEGATUS, Rüppell. "The Somáli Jackal (male), fine and large: probably on account of the quantity of Sheep's tails which he has devoured. He carries off kids and lambs, rather disdaining garbage; and unless driven away by dogs, he is capable of doing great damage to the flocks. The Somáli call him *Dowao*, دواو."

**HYÆNA CROCUTA*? (Erleben), var.? Bright fulvous *Hyæna*, with dark spots not very distinct, and a black tail-tip: probably of the race termed *H. CROCUTA RUFA* by Fischer, and which Dr. Gray refers to *H. BRUNNEA*, Thunberg (*H. rufa*, Cuv., and *H. fusca*,† Geoffroy), from S. Africa (Pt. Natal); but which is not the 'Strand Wolf' of the Cape colonists (who term the common Spotted *Hyæna* the 'Tiger Wolf'), or *H. VILLOSA*, A. Smith, which Dr.

* Vide p. 252, ante.

† This name more probably refers to the specimen in the Paris Museum described by Cuvier, *Oss. Foss.* VII, 318 (4th edit.), and which is evidently *H. VILLOSA*, A. Smith (*Lin. Trans.* XV, pt. 2, 461.,

several species which have been more or less confounded under *G. DORCAS*; and quite distinct from the common Aden Gazelle, which is frequently brought alive to Calcutta. One marked peculiarity consists in the ears being of an ash-grey colour, contrasting strongly with the hue of the neck and doubtless also of the body. Horns robust, curved backward and then upward, and diverging but slightly; much longer, and with the annuli wider apart, than in the Aden Gazelle, though the animal would seem to be of the same size. The horns of the female are very much stouter than we have seen in any other female Gazelle, and follow the same curve as in the male, having rudimentary annuli. Muzzle whitish, with a strongly contrasting black nose-patch. The Society possesses a species of Gazelle (habitat uncertain), which much resembles the Aden Gazelle except in being considerably larger, with proportionally longer and more distantly knobbed horns, much as in the present race: but both of these have the ears rufescent and not ashy. At present, we are far from being satisfied with the manner in which Dr. Gray has brought together sundry of these affined races of Gazelle, in the *Proc. Zool. Soc.* for June 11th, 1850 (*Ann. Mag. N. H.* VIII, 1851. p. 131). It seems like cutting rather than unravelling of the tangled knot. Lt. Burton writes—"A kind of Gazelle called by the people *Dera*, دبرا; as you may observe that there is an elevation of loose replicated skin upon the nose. It seems to live during the dry season without water, and affects the desert, not being very shy in presence of man, but avoiding jungle. They are found in flocks."

**MADOQUA SALTIANA*; *Antelope saltiana*, Blainville; *A. madoqua*, H. Smith. A beautiful skin of a male; and heads of two other males and of a female. "This little Antelope is called *Sagaro*, سكرو, by the Somál; *Beni Israel* in Abyssinia; and *Ghazalah* by the Arabs. It abounds throughout the country generally in pairs, and is fond of ravines under hills, the beds of nullahs, and patches of desert vegetation. In the northern Somáli country, these Antelopes are caught in snares: elsewhere they are run down on foot, taking half a day on account of their great swiftness. The Jackal (*CANIS VARIEGATUS*) cannot catch them. They sleep by day under the trees; and in the plains their dung (which becomes peculiarly fetid with a musky odour in the sun) is found in heaps as if they

assembled for that purpose." Many animals resort habitually to one place to deposit their dung: among them the Indian Rhinoceros, which in the Rajmahal hills is watched for and shot by the natives at such places; and we have observed the Indian Four-horned Antelope to exhibit the same propensity, when tame and loose in a large enclosure.

**OREOTRAGUS SALTATRIX*; *Antelope oreotragus*, Forster: *A. saltatrix*, Boddaërt. The '*Klip-springer*' of the Cape colonists. Head of female, and one fore-foot. "A kind of Antelope called *Alakrut*, *الاکروت*. They live in the higher ranges of the mountains, only in pairs, and are not unlike the Musk-Deer in coat. They are by no means shy, seldom flying before the foot-fall is heard. They hop in an awkward manner on the points of the hoof, at no great pace or distance at a time. The people of the country prize the venison."

AVES.

PROCEPHALUS RUFIVENTRIS, (Rüppell). "The only species of Parrot observed in the Somali country. These birds fly in considerable numbers; and they have red irides."

**HELOTARSUS ECAUDATUS*, (Daudin): *Bateleur* of Levaillant. "Called *Nabodi*, *نابودي*. There are many superstitions about this bird, and its shadow is supposed to be injurious to children. This may be accounted for by the habit it has of swooping down upon any one carrying meat. It devours the small Antelopes and birds, and generally soars high, but I have seen it wheeling close overhead. The female lays one egg in a large loose nest of sticks on the top of tall trees, and if the egg be taken she abandons her home. Irides red."

**MELIERAX POLYZONUS*, Rüppell. "A kind of red-eyed Sparrowhawk, very swift. The people call it *Hatkaadag*, *هاتکادگ*."

**BUBO* (?) *AFRICANUS*, (L.), Temmink, p. c. 50. Called *Skimír libah*, *سمیرلیباہ*, the "Lion-bird." This is probably the species so identified by Rüppell, though not well according with the descriptions to which we have access. Size of ordinary *ASIO* (v. *OTUS*), but the auditory aperture as in *BUBO*. Length about 16 in.; of wing 12 in.; and tail 7 in. Colour rufous-brown above, speckled and variegated with dull black, and some oval white spots bordering

on that side, as well as the rapidity of the motion, were very remarkable." The muzzle is completely furred; and the rudimentary or short tail is furnished with long hair (as in the *SCIURIDÆ*). The rodential tusks are narrow and rounded; and in *CTENODACTYLUS* there are only three molars on each side above and below, and which are surrounded with enamel; the upper having one deep indentation externally, the lower being indented on both sides. In our new genus there is a small and simple fourth molar anteriorly above and below; and the next to it above is smaller than the third and fourth, and seems to have no distinct indentation (the molars being, however, much worn away by attrition in the specimen examined). The lower jaw of *PECTINATOR* is very remarkable for shewing no indication even of a coronoid process; a fact not mentioned by Mr. Yarrell in his description of the anatomy of *CTENODACTYLUS*. The condyle is small, and articulates on a level with the crowns of the molars. The auditory bullæ are remarkably large, and are seen from above (as in *CHINCHILLA*).—The ant-orbital foramen is large. Palate contracted, narrowing to the front; and the post-palatal emargination is continued forward to a line with the middle of the last molar. Externally, *PECTINATOR* is distinguished from *CTENODACTYLUS* by having the tail and ear-conch well developed; a smaller eye; and apparently a general adaptation for more diurnal and less fossorial habits. The eyes are scarcely so large as in a common Rat. The auricles are broadly ovoid, sub-nude, with a fringe of whitish hairs on their anterior margin, and a patch of dense whitish fur at base on their outer surface. Length of *P. SPEKEL*, from nose to base of tail, about 6 in.; and tail probably $2\frac{1}{2}$ in., or with hair $3\frac{1}{2}$ in. Tarse with toes $1\frac{1}{2}$ in. Auricle (measured posteriorly) $\frac{1}{2}$ in. The skull measures $1\frac{1}{2}$ in. in length, and $1\frac{1}{8}$ in. in greatest breadth (at the *zygomata* posteriorly); between the orbits somewhat exceeding $\frac{1}{2}$ in. Fur soft and moderately long, of a sandy grey-brown colour, slightly washed with rufous especially on the crown; the basal half of the piles pale dusky: at the *nates*, the fur is more dense and woolly, and rufescent-whitish or pale isabelline: the moustaches are chiefly black, and the longest of them measure about 3 in: the hairs upon the tail are shorter towards its base, then lengthened as in the Squirrels; these long hairs being of a

sullied or isabella-white for the basal half, and then black with a white tip: hence, in the living animal, the bushy tail would appear whitish along its middle, with broad black lateral and longitudinal bands, which again are fringed externally with dull white: hairs upon the feet whitish, the tufts or brushes over and impeding the hind-claws shewing conspicuously: the combing apparatus of the innermost hind-toe consists of some exceedingly harsh and stiff short bristles immediately impeding (but shorter than) the claw, and above these again are some equally short bristles which are not quite so rigid; over which is finally the long incurved tuft of finer bristles, the lowermost of which are shorter and more rigid than the upper: on the next toe the same remarkable structure is seen, and more easily felt, but is considerably less developed.*

**HYRAX HABESSINICUS*, Hemprich and Ehrenberg: *Ashkoko* of the Appendix to Bruce's Travels; recognised as a distinct species by Dr. Gray; but referred by Dr. Rüppell to *H. DAMAR*, Cuvier, v. *SYRIACUS* of Schreber. Half-grown specimen. "The Somál call it *Bauni*, بوني. It inhabits rocky ground and delights in sunning itself, running about the rocks, and living in chinks and holes. Neither Lt. Speke nor I ever saw it in the plains. The Arabs here eat it, but the Somál do not."

**GAZELLA* ———? Heads of male and female, of one of the

* This discovery of a second generic form of a peculiar group, hitherto represented only by *CTENODACTYLUS* (which has long stood quite isolated among other *Rodentia*), will be hailed with some satisfaction by those who have paid attention to the classification of the Order, and will tend to remove such doubts as may exist of the propriety of recognising this as a separate family (however limited, according to present knowledge), about equivalent to the *CHINCHILLIDÆ* of St. America, to which, upon the whole, the *PECTINATORIDÆ* would seem to be more nearly affined than to any other known form. It is highly probable, however, that more species and even generic forms remain to be discovered of this peculiarly African family; and that it will prove to be at least as extensive as the *CHINCHILLIDÆ*; and perhaps that even *PETROMYS* should be admitted within its extreme confines. Capt. Lyon's Tripoli animal, with tail reduced to a mere tubercle, is certainly one species which has not yet been scientifically examined; and the *Gundi Marmot* of Pennant is probably another: but these little mouse-coloured rodents seldom attract the attention of unscientific collectors; unless, indeed, it should so happen that their attention had been especially directed to them.

the scapularies and upon the wings: lower-parts barred with narrow transverse dusky rays, each margining a broader rufous band; tarse almost spotless dull white: primaries and tail banded. Head and neck (with aigrettes) rufous, each feather having a terminal blackish spot, extending up more or less as a medial streak: facial disk black-tipped; and the radiating plumelets whitish, tinged with rufous.

**BUCEROS* (*TOCKUS*, Lesson,) *FLAVIROSTRIS*, Rüppell. "A common bird, called by the Somál *Kudunkutu*, كدكنطو. He makes a loud quacking noise, not unlike a frog; is fond of the jungle trees, and is noisy about sunrise."

**PROMEROPS SENEGALENSIS* (?), Vieillot: *Nectarinia melanorhynchos* (?), Licht. "A bird with an offensive smell; flies in flocks, and feeds in acacia trees. It is numerous on the plateau." This is distinct from the Cape species, *PR. ERYTHORHYNCHOS*, (Latham); but may perhaps be the Abyssinian bird which Dr. Rüppell refers to the latter (*Systematische uebersicht*, &c., p. 28). Beak black, but red internally: not much curved, and measuring $2\frac{3}{4}$ in. (in a straight line) from gape to point: wing $5\frac{1}{2}$ in.; and middle tail-feathers 9 in. The white spots on the wings and tail are considerably more developed than in the Cape species, and extend quite across six of the primaries, without being divided by black along the shaft of the feather. The coloured glosses also are less splendid than in the Cape bird, save chiefly on the throat.

**PR. MINOR*, Rüppell. Two specimens, male and female; the latter having a considerably smaller and still more arched bill. "This bird makes a loud noise, and inhabits large trees, especially the acacias."

DENDROBATIS ÆTHIOPICUS, (Ehrenberg). "Heard tapping the hollow trees, like the Woodpeckers of Europe. These birds abound on the plateau. They are called *Daudaulay*., دودولي, from the sound."

**DENDROMUS HEMPRICHII*, Ehrenberg). "This small Woodpecker is commoner than the last, and also inhabits the plateau."

**CHIZEBIS LEUCOGASTER*, Rüppell. "Called in some parts of the country *Gobiyan*, گوبیان; in others *Fât*, فات. It is a noisy bird, with a loud cry, and has all the cunning of a Magpie when pursued. It is fond of the thick trees on the banks of ravines. The Arabs call this bird *Kakatua*, and consider it a species of Parrot."

OXYLOPHUS GLANDARIUS, (L.) "Only this specimen obtained."

***COEVUS AFFINIS**, Rüppell. Two specimens. "Common all over the country. Somáli, *Tukka*, &c.

"In the Harar hills I remarked another variety, very large, with a bright white patch on the back of the head, and a tremendous beak, arched and exceedingly hard. It is a very strong bird, taking a powerful load to kill: my Somális had never seen it before." The **COEVULTUR CRASSICOLLIS**, Rüppell, is here intended.

***C. UMBRINUS** (?), Sundevall. Not having seen a description of this bird, we are not quite certain that it is correctly identified; especially as the late H. E. Strickland remarked of it, after noticing **C. SCAPULATUS** (**PHŒOCEPHALUS**, Cabanis),—"Distinguished by the length and curvature of the beak, and by the grey-brown tint of the head and neck."* In the Somáli specimen under examination, the beak resembles that of **C. SCAPULATUS**; and there is a further general agreement of size and structure, extending to the shape of the feathers. The bird was evidently young, and a dull brown tint prevails on the plumage, especially on the head and neck, which might well have suggested the appellation *umbrinus*. Can it, however, be the *young* of **C. SCAPULATUS**? Lt. Burton writes—"A common Crow. *Sometimes the breast-feathers are tipped with white, in small semi-circles extending as far as the abdomen.* The Somáli do not distinguish between this and the other Crow." On the other hand, may it be a variety of **C. SCAPULATUS**, as **C. CORONE** is certainly a black variety of **C. CORNIX**,† and as the black variety of **C. SPLENDENS** which inhabits Burma?

***AMYDEUS RUPPELLI**, Verreaux; *Lamprotornis morio* apud Rüppell, but distinct from **A. MORIO**, (L., *verus*), of S. Africa. Male and female. As compared with fine specimens of both sexes of the Cape species, this bird has a shorter and deeper bill, with more arched upper outline; longer wings; and much longer tail: but the colouring of the plumage is nearly the same; except that in the female of the northern bird, the head, neck, and breast, are paler and *unmixed* ash-gray; and in both sexes there is much more black tipping the primaries. Both have the rudimentary first primary black; but in the Cape species, the rest have both

* *Ann. Mag. N. H.* IX (1852), p. 345

† We possess an intermediate specimen from Norway.

webs rufous to very near the tip; whereas in the northern bird, the black is continued along the outer web to near its emargination, and also far up the margin of the inner web: in the second (or first developed) primary of *A. RUFFELLI*, the outer web has its terminal $\frac{2}{3}$ black, and the inner web its terminal $\frac{2}{3}$, the two colours being distinctly defined apart; whereas the corresponding feather of *A. MORIO* is rufous throughout, passing insensibly into weak dusky at tip, and along the margin of the inner web. In *A. RUFFELLI*, the length of wing is—male 7 in., female $6\frac{1}{2}$ in.; middle tail-feather—male 8 in., female $7\frac{1}{2}$ in.; bill to gape $1\frac{1}{2}$ in., and fully $\frac{2}{3}$ in. in vertical depth. The corresponding measurements in *A. MORIO* are—6 in. and $5\frac{1}{2}$ in., $5\frac{1}{2}$ in. and 5 in., and $1\frac{1}{2}$ in. by $\frac{5}{16}$ in. • This bird is found all over the hills, follows the cattle, and flies in flocks seldom exceeding 6 or 7. The eye is dark.”

**LAMPROTORNIS SUPERBA*, Rüppell. “A kind of *Maina*, called *Lhimber-load*, لمبرلود, the ‘Cow-bird.’ It is found in large flocks, and is fond of cows, whence its name. Irides white.”

**SPREO ALBICAPILLUS*, nobis, n. s. Length about 12 in.; of wing $6\frac{1}{2}$ in.; and tail $4\frac{1}{2}$ in., its outermost feathers $\frac{1}{2}$ in. shorter: bill to gape $1\frac{3}{8}$ in.; and tarse $1\frac{1}{2}$ in. Colour dull metallic green, with a white cap, vent, lower tail-coverts, tibial plumes, flanks posteriorly, axillaries, and under wing-coverts: rest of the lower-parts with narrow brownish-white mesial streaks to the feathers, which are sub-acuminate, and but slightly streaked on the chin and throat: secondaries chiefly dull white on their exterior webs, forming a large patch on the wing. Bill and feet black. As compared with the Cape species, *SPE. BICOLOR*, (Gmelin; *Lamprotornis albiventris*, Swainson), the bill is less slender and Thrush-like, having more of the *LAMPROTORNIS* form; and the tarsi are shorter: but we do not hesitate to refer it to the same genus. “Its Somali name is *Hanagur*, حنين اكر. The eye, like that of the *Maina*, is white; and it flies in large flocks.”

**BUPHAGA ERYTHROHYNOCHA*, Stanley. *Hurio*, هرو. “This bird clings to Camels, and injures the wounded by picking out parasites and larvæ. Its eye is a light and brownish red. Habitat generally the plateau above the hills.”

**HYPHANTORNIS BAGLEFECHT?* (Vieillot). This bird seems to agree sufficiently with Buffon's description of *le Baglefecht*.

Length about $6\frac{1}{2}$ in.; of wing $3\frac{1}{2}$ in.; and tail $1\frac{1}{2}$ in.: bill to forehead 16 in.; and tarse $\frac{1}{2}$ in. Crown and under parts bright golden-yellow, paling a little or passing to a purer yellow on the belly and lower tail-coverts, including the tibial plumes: back greenish-yellow with dusky mesial streaks; upper tail-coverts and tail yellowish olive-green, the rump somewhat yellower: wings dusky, the small coverts margined with greenish-yellow, the greater coverts and tertiaries with pale yellowish-brown, and the primaries with dull yellow: lores, ear-coverts, chin and throat, black, passing backward as a straight line from the nostrils, so as just to include the eyes. Bill infuscated, probably changing colour according to season; and feet brownish-carneous. "This bird flies in large flocks, and is fond of flowers, blossoms, and grass-seeds; avoiding jungle and trees."

**PASSER CASTANOPTERUS*, nobis, *n. s.* Length about 5 in.; of wing $2\frac{1}{2}$ in.; and tail 2 in. Structure typical. Crown and occiput, scapularies and wing-coverts, vivid light chestnut: back, rump, and upper tail-coverts, greenish olive-grey, the first black-centred: cheeks and lower-parts clear pale yellowish, sullied with olive on the flanks: the usual black gular mark, extending down upon the breast; and the lores and feathers at the base of the lower mandible also black: a trace of a white wing-band; and the great alars and caudals dusky, more or less pale-edged, the margin broadest and more rufescent on the tertiaries. Bill and legs as in *P. DOMESTICUS*. "This species of Sparrow affects the jungles."

**P. (?) TRISTRIATUS*; *Serinus tristriatus*, Rüppell. Bill typically formed; the white gular mark as in *P. GULARIS*, Lesson (*P. simplex* apud Swainson), of W. Africa: feet and claws more slender and delicate than in other Sparrows; and the plumage soft and lax. "Inhabits the mountains, and flies in flocks."

"The common English Sparrow does not exist in the part of the Somali country visited by Lt. Speke: and it is generally asserted that it cannot live in Aden. The experiment of transporting them was tried by an officer, who brought from Bombay a batch of Sparrows and Crows. The former soon died; and the latter lingered through an unhappy life, became mangy, and (to judge from the absence of young) ceased to increase and multiply."

**PYRHULAUDA LEUCOTIS*, (Stanley). "Found only at the village

of 'Goree Bunder:' the female has no black upon the breast, and somewhat resembles our Hedge-sparrow (*ACCENTOR MODULARIS*) in colour, only that she is a lighter."

**LANIARIUS CRUENTUS*, (Ehrenberg). "By no means a common bird. The Somalis call it *Idatris*, ادتريس."

PLATYSTHIRA SENEGALENSIS, (L.).

SAXICOLA ISABELLINA, Rüppell, *Atlas*, pl. 34, f. b.: according with the figure cited, except in having a greater extent of black tipping the tail-feathers, viz. $1\frac{1}{2}$ in. on the outermost: but apparently distinct from the species sent by Dr. Rüppell himself as his *S. ISABELLINA* (p. 260, *ante*), however closely affined. In the latter the short first primary measures 1 in.; in the Somali bird $\frac{3}{4}$ in. only, being also considerably narrower. In Dr. Rüppell's bird, the crown is fuscous, and the upper parts are much infuscated; the lower dull ferruginous with white throat, and the lower tail-coverts deeply tinged with ferruginous: lores black, surmounted by white, which is continued into a slight supercilium; and the outermost tail-feather is black for its terminal $1\frac{1}{2}$ in.: tertiaries broad, measuring about $\frac{3}{4}$ in. across; and the bill somewhat broader than in the other, especially at base. The Somali bird is pale sandy-isabelline above, still lighter below and without a tinge of ferruginous; and the tertiaries are about $\frac{1}{2}$ in. in breadth: both have the upper tail-coverts white; and they agree in dimensions. "Inhabits the plateau."

**S. MELANURA*, Temminck. "Inhabits the plateau, and loves small trees." There is a figure of this bird, from a specimen obtained in Sindh, among the drawings of Sir A. Burnes and Dr. Lord.

**DICRURUS LUGUBRIS*, Ehrenberg. "This 'King-crow' follows the flocks, perching upon animals, and balancing itself upon the waving plants. Irides red."

NECTARINIA HABESSINICA, Ehrenberg. "A Honey-bird, lighting upon flowers, and avoiding jungle."

**N. ALBIVENTRIS*, Strickland, Jardine's *Contr. Orn.* Male and female. "Seen in pairs; and like the last inhabits the plateau above the hills." This species has only been obtained in the Somali country.

PTEROOLES SENEGALENSIS, (Latham): *Pt. guttatus*, Lichtenstein.

Male and female. "This has all the habits of the corresponding Indian bird" (Pt. *EXUSTUS*, which is likewise African), "and is found on the plateau, where huge flocks abound. It is called *Fuku*, نفقو."

*Pt. *LICHTENSTEINI*, Temminck. Lt. Burton mistakes this for the Indian 'Painted Rock Pigeon' or 'Painted Grouse' of sportsmen (Pt. *FASCIATUS*); to which it is generally affined, but readily distinguishable upon comparison, being a considerably larger bird, &c. He remarks, that "it is the *Katá*, كاتا, of Arabia, and is here called by the same name as the last, *Fuku*. It flies in flocks, and goes to great distances every evening to find water. If disturbed at the well, it flutters about with piercing cries. In Arabic poetry, it is used as a simile to express great swiftness."

**PTERNISTES RUBRICOLLIS*, (Latham). Male and female. "Common in the Somáli country. The natives call it *Dignin*, دگنن; the Arabs *Dijajat el bar*, دحاجت البر, or 'wild hen'; and the Persians (I believe) *Kabk*, كبک. It represents the domestic fowl in E. Africa; and its flight and run resemble those of the Guinea-fowl. It is a strong bird, requiring heavy shot, and has a game flavour. The Somáli have a prejudice against eating these, as well as other birds."

**SCLEROPTERA GUTTURALIS*, (Rüppell). "Found on the top of the mountains, and not observed on the plateau or on the maritime plain." This is one of the African Partridges classed in *FRANCOLINUS* by Dr. Rüppell, Dr. A. Smith, and others; but which do not range well with the Asiatic *FR. VULGARIS*, *FR. PICTUS*, *FR. CHINENSIS* (Osbeck, v. *perlatus*, Gmelin, of China, whence introduced into the Mauritius, and there known as the 'Pintado Partridge'), and *FR. PHAYREI* (of Pegu). They form a particular group, which is peculiar to Africa.

"Lt. Speke saw, but did not procure, a species of Corn Quail. I also observed many small Quails in the northern Somáli country, In the Gudabuzi country I observed the usual Dove of these climates, a fine large blue Pigeon like the 'Blue Rock' of India. The natives called it *Elal Jag*, ايلالچى, or the 'haunter of wells.'"

**SYMPHROTIDES HUMILIS*, nobis, n. s. "A Floriken 'with bright yellow iris, called by the Somális *Waradada*, وارا دا دا. Its cry is a

loud *Ka-ke-rák*. It is found in the plateau among heather" (low herbage), "and is not so shy as the Indian bird" (meaning probably the *Likk* of Bengal or 'Floriken' of S. India, *S. AUREITA*). "Its pair [the male ♂] is smaller, and the feathers below the lower mandible are black."

A small and undoubtedly new species, remarkable for its very short tarsi. Plumage similar to that of a pale female *S. BENGALENSIS*; but the neck tinged with ashy, and the crown more fully crested: wings white underneath, but the long axillary feathers black; primaries dusky-brown, not banded; the secondaries blacker; and a large white spot formed by the basal $\frac{1}{3}$ of the coverts of the primaries: throat speckled with black. Length of wing $9\frac{1}{2}$ in.; of tail 5 in.; bill $1\frac{1}{2}$ in.; and tarse $2\frac{1}{2}$ in. only. A female specimen, to all appearance.

"Lt. Speke also observed a large species of Bustard" (probably *EUPODOTIS ARABIS*). "Ostriches are found all over the Somali country: they are very shy, and at about 3 P. M. disappear to hide themselves for the night. The natives say that the Ostrich is blind at night, and that they can then easily be killed."

**EDIONEMUS AFFINIS*, Rüppell. Well distinguished from *O. CREPITANS*. "Called *Hedinhitu*, هدينهيتو, a name also given to a smaller Plover. It is half blind during the day, and may almost be ridden down, as it rises under the horse's hoofs with a loud cry. The eye is a light yellow. Its habits correspond with those of the Indian bird" (*O. CREPITANS*). It is found in all the upper regions of the Somali country.

**CHENALOPEX EGYPTIACUS*, (L.) "Called *Etab-Jaz*, اتابج, 'who lives at wells.' It was found on the plateau at a brackish spring, and never observed on the coast."

**PHALACROCORAX LUGUBRIS*, Rüppell (*Carbo melanogaster*, *cuv.*, *Par. Mus*) "A common *palmipede*, shot on the sea-shore."

REPTILIA.

The reptiles consist of two Lizards and a Snake, neither of the former full grown.

**AGAMA RUDEBATA*, Olivier (*A. mutabilis*, Merrem, &c.) A small specimen apparently of this or a closely affined species, with tail

not much longer than the head and body, exceedingly compressed throughout, and somewhat serrated above and below.

**TILIQUA BURTONI*, nobis, *n. s.* Small and young individual, $5\frac{1}{4}$ in. long, of which tail $3\frac{1}{4}$ in. Very like *T. RUFESCENS* of India; but the auditory orifice conspicuously smaller, and a series of broad scales along the upper surface of the tail: occipital group of plates also differently formed. Colour dark, with the two pale streaks upon the head and body strongly contrasting; and the throat freckled with dusky.

**PSAMMOPHIS SIBILANS*, (L.); *O. moniliger*, Lacepede. Var.? Apparently one of the many varieties of this common African Sand-snake, of a plain pale sandy-brown colour, somewhat more ruddy on the sides, and paler below; a dark brown streak passing through the eye, but no stripe on the body; the labials and sides of the abdominal plates obscurely and minutely freckled with buff-colour on a whitish ground. When the body is bent, the dark skin between the scales shews at the tip of each (on the convex side of the bend), imparting a speckled appearance: 17 rows of scales; scutæ 172; scutellæ 90 pairs. This Snake, according to Lt. Burton, is "called *Mas*, *مس*, in Arabic *Hansh*, *حنش*. It infests the lower hills (this specimen was found upon the plateau), and is much feared by the natives when travelling at night. It is said to be very venomous. There are many other varieties." It is not venomous.

PISCES.

**TETRAODON DIADEMATUS*, Rüppell. This is the only fish sent. And of

ANNULOSA.

A Scorpion and three species of *Coleoptera*.

Notes on the Languages spoken by the Mi-Shmis, by W. ROBINSON, Esq. (Communicated by the Government of Bengal).

The mountain tribes, known to the inhabitants of Assam under the general appellation of Mi-Shmis, occupy those ranges at the north-eastern extremity of the valley, that stretch in the form of a crescent from where the Di-bong debouches into the plains, on the West, to the mountains inhabited by the Singpho tribes, on the East.

Whatever may be the origin of the term *Mi-shmi*, as applied to these mountaineers, it is not recognized by themselves, except in their intercourse with the people of the plains.

Like most other mountain tribes they are divided into a vast number of petty clans, each of which has a nominal head, but these seem so intimately connected with each other, that it is difficult to ascertain in what consists the difference that separates one clan from another. Their lingual peculiarities, however, separate them into three distinct divisions, and, adopting the name of the three great tribes among whom these differences of language prevail, we may class them as the NEDU Mishmis, the TAYING or ME-ME Mi-Shmis, and the MIJHU Mi-Shmis.

The Nedu or, as the Assamese generally designate them, the *Ohuli-Koté* Mi-Shmis, from the circumstance of their wearing their hair short, are the most western of the Mi-Shmi tribes. They occupy the mountains on both banks of the Di-bong, and speak a language peculiar to themselves, yet bearing some affinity to that spoken by their neighbours the Abors and Miris.

The Taying (Taen) or Me-me Mi-Shmis, extend eastward from them to the right bank of the Lohit—the Brahmaputra, while those tribes on the left bank of the great river, are known as the Mi-jhu or Mai-jhu Mi-Shmis. These latter possess many vocables in common with the Singphos, showing the existence of an affinity in the two languages that might have been expected from the geographical position of the tribes speaking them.

At the close of the year 1844, Capt. E. A. Rowlatt, undertook a tour into the Mi-Shmi hills, and his Report of the Expedition was

published in the XIV. Volume of the Asiatic Society's Journal, (see p. 477). I fear I can add nothing of importance to the valuable information he then communicated regarding the manners and customs of this people. I shall, therefore, confine myself on this occasion to a few notes on the grammatical peculiarities of two of the Mi-Shmi dialects, the Taying and Mi-jhu, the only two I have yet had an opportunity of investigating.

The Language of the Taying and Me-Me Mi-Shmis.

OF NOUNS.

Nouns admit of no variations expressive of *number*; the plural state is generally defined by a numeral, or some other word expressive of quantity. Thus; Nkoe, a *dog*, Nkoe Ka-prei, *four dogs*, Nkoe-Su-Newe, *many dogs*.

Nor are the accidents of *case*, distinguished by any inflections or differences of termination. The genitive case is denoted merely by the juxta-position of the two substantives; the former being understood to be in the genitive case, e. g.

Tamium lami, *the monkey's tail*.

Machom hari, *the root of the tree*.

Maji ru, *the buffalo's horn*.

The accusative is the same as the nominative, and is distinguished only by its position in the sentence.

* Ha tekü bri no, *I want to buy paddy*.

A ro lum ma-bie, *the boy will not catch the goats*.

The other relations of nouns are marked by the use of post-positive particles.

Gender, in individuals of the human family, is marked by the use of distinct terms. For example:

Mawa, *man*—mia, *woman*.

Naba, *father*—nama, *mother*.

Ayewa, *son*—ayia, *daughter*.

Pamyo, *younger brother*—mathis, *younger sister*.

In the case of the inferior animals, the appellatives *karü*, *male*, and *tassi*, *female*, are added to the noun. E. g. Majari karü, *a male cat*—majari tassi, *a female cat*.

Nkoe karü, *a dog*—nkoe tassi, *a bitch*.

Machu karü, *a bull*—(bos) machio tassi, *a cow*.

The only exception to the general rule is in the case of the domestic fowl—inteo.

Inteo tala, *a cock*—inteo tassi, *a hen*.

OF ADJECTIVES.

Adjectives do not alter their terminations to express either number, case or gender. The position of an adjective in a sentence is invariably after the noun it serves to qualify.

Nye-chi che-bwa, *sweet milk*.

Machi ji-eh, *a broad river*.

Phaji a hungya, *a ripe plantain*.

As the language rejects terminations of every kind, it of course has none to make the degrees of comparison. The deficiency is in some measure supplied by shortening or prolonging the adjective in articulation. For example; *ká-jem katyoa*, *a short cloth*. When it is intended to convey the idea of *a very short cloth*, the qualifying word *katyoa* is uttered with a short and abrupt sound.

Alyim kálong, *a long road*. By lengthening out the sound of the adjective, *kálong*, the idea conveyed would be that of *a very long road*.

The mode of *numeration* that obtains among the Taying and Me-me Mi-Shmis, presents us with a few interesting peculiarities. The system is emphatically a decimal one.

- | | |
|--------------|--|
| 1. E-Khing. | 11. Halong Khing. |
| 2. Ka-ying. | 12. Halo-kaying or Halo-raying. |
| 3. Ka-chong. | 13. Halo-rachong. |
| 4. Ka-prei. | 14. Halo-raprei. |
| 5. M-angu. | 15. Halong manga. |
| 6. Tharo. | 16. Halong tharo. |
| 7. Uwe. | 17. Halong uwe. |
| 8. Elyem. | 18. Halong elyem. |
| 9. Konyong. | 19. Halong konyong. |
| 10. Halong. | 20. Halong-halong, vel
Kaying halong. |

30. Kachong halong, the unit following the decade in regular order.

40. Kaprei halong.

50. Manga halong, &c. &c.

100. Malum, 1000 Re-jong.

There are no ordinals in the language.

OF PRONOUNS.

There is no distinction of gender in the pronouns of this language. In the case of the 1st and 2nd person, the sex is supposed to be known, and in the 3rd person it must be inferred by a reference to its antecedent.

THE PERSONAL PRONOUNS ARE—

Singular.

1st Há. *I.*

2nd Nyó. *Thou.*

3rd Mtá. *He or she.*

Plural.

Hing long. *We.*

Nyó long. *Ye.*

Mta long. *They.*

The relations of *cases* are denoted in the same manner, as already exemplified with reference to nouns substantive.

The Demonstrative Pronouns are Esá the proximate, and Hisá, the remote. These are reduplicated to denote the plural.

Esá-esá *these*, and Hisá-hisá *those*.

The Interrogative Pronouns are Sáhá, *who?* Esá-há, *which?* and ságehá, *what?*

Relative Pronouns are very vague, so much so indeed, that I am unable to speak with precision of the existence of any, sentences being in general so rendered as to obviate the necessity of them. Thus, instead of the phrase, "*the man who died*," a Taying would say, Nme siyoge-á, *the man he died or the dead man*. So also the phrase Tou-chi bri-á—"the oil it was purchased," would be used for, *the oil which was purchased*."

OF VERBS.

The various kinds of verbs in this language must be denominated wholly from their meaning and signification, as active, passive, neuter, causal, &c.

The relations of time are expressed by affixes, except in the *present tense*, which may be taken as the root of the verb; and only three Tenses can be traced in the language, viz. the Present, the

Past and the Future. Verbs undergo no modification consequent on number or person.

INDICATIVE MOOD.

Present Tense.

Há átyá, *I speak* ; Nyo átyá, *Thou speakest* ; Mta átyá, *He speaks* ; so also, Há de, *I sit* ; Nyo dwe, *Thou standest* ; Mta chu, *He runs* .

The *Past Tense* is formed by the addition of á ; Há átyá-á, *I did speak* ; Há de-á, *I did sit* ; Nyo dwe-á, *Thou didst stand* ; Mta chu-á, *He did run*.

The *Future Tense* is formed by adding Ande or Ende to the root of the verb. Há aty-ande, *I shall speak* ; Nyo de-ande, *Thou wilt sit* ; Mta chu-ende or chuyende. *He will run*.

Gerund.

The language has no affix to mark the Gerund or to indicate the Infinitive Mood ; the position of the verbs in a sentence being considered sufficient to indicate their meaning.

¹Mta ²teku ³bu ⁴no, ¹He ⁴wants ³to ²buy rice.

¹Mta ²machom ³teo ⁴te, ¹He ⁴cuts ²down ³the tree ²to ³sell it.

In some few instances, however, the particle ge, is used after the verb, apparently as the sign of the Gerund.

E. g. ¹Mia, ²a ³esa ⁴huv-ge ⁵tase-ge ³bonde,
²These ¹girls ⁵will go ³to dance ⁴and to sing.

THE IMPERATIVE MOOD

is formed by the addition of the particle a, or na, to the verbal root. As in commanding, it is obvious, it is only the second person that is addressed, this mood may be said to exist only in that person.

Nyo bona, *Go thou* ! Be-an-a, *Be silent* !

Nyo tap-pa dwe-na, *Lift up your spear* !

Prohibition

is implied by the addition of gá to the root.

Oku-ga, *Do not steal* ; Se-ga, *Do not kill*.

Nyo na-pho khomeide-ga, *Do not be angry with your brother*.

Simple Negation

is commonly expressed by the word yem, or yom, appended to the root of the verb. Mta mara yom, *He does not laugh.* Mta, nyo abba no-yem, *He does not wish to strike you.*

But in the future tense, negation is implied by the word Lum. Ha-che-lum, *I shall not take it.* So lung ma-chu nye-chi hong-lum, *To-morrow the cow will give no milk.*

POTENTIAL MOOD.

When power or capacity is to be expressed, the word Hanende is added to the root of the verb.

Atya han¹ende, *I can speak.*

Mta bo han¹-ende, *He can go.*

In the *Negative* form, Hane lum is substituted.

Atya¹ hane lum, *I cannot speak.*

Mta Khre muba hane lum, *He cannot work, or has not the power to work.*

Particles.

Adverbs sometimes precede and sometimes follow the verbs they serve to qualify. Chy amte, *Quickly*; Chy¹ amte chuna, *Run quickly*; Beh-e, *slowly*; Beh-e chia, *Walk slowly*; Beh-mte, *Quietly*; Beh-mte chona, *Put it down quietly*; Cha lung, *To-day*; Beling, *Yesterday*; So-hing, *To-morrow*; Mja Kanong? *Why?* Hno? *Where?* Kadego? *When?* Omam, *Yes*; Sam, *No.*

The *Prepositions* of occidental languages are, in this, rendered by post positive particles. For example:

Kwa¹in: má²ye pya an kwá³ á⁴,

The eggs are in the nest.

Do with: mta togo do nokwe chende⁵,

He will kill the dog with the da.

Tomno with: Nya¹ tomno sa naha²?

Who has come with you?

Tappe from: Kreko tap¹ pe ke ku chenema⁴,

⁴Bring ³the ²rice ¹from ⁴the ³basket.

¹E ²tappe ³machi ⁴Kade-gadyá,

⁴How ³far ²is ¹the ²river ¹from ⁴this?

In ordinary conversation these particles are frequently omitted, where the sense can be ascertained without them.

¹Haban ²ta ³mya ⁴á? ³Is ²there ¹a ²tiger ¹in ⁴the ³jungle?

Eya, Bidega, *There is. Fear not.*

Tamya elapi ha onde, *If there is a tiger I shall shoot him.*

Nyo mpo tawan thui aha? *Are your arrows poisoned? or literally, Have you any poison in your quiver of arrows?*

THE LANGUAGE OF THE MI JHU MI-SHMIS.

Of Nouns.

Gender.—This language possesses a variety of substantive terms, sufficient to denote all that is needful in the distinction of sex among human beings. Thus :

Ktchong, *Man* ; Kmai, *Woman*.

Kepai, *Father* ; Mum, *Mother*.

Sha, *Son* ; Kmai sha, *Daughter*.

Tchep-mai, *Brother* ; Ke-tchep mai, *Sister*.

Kesa, *Boy* ; Mai-sa, *Girl*.

In the case of the inferior animals, the difference of gender is denoted by the terms Nga-long, *male*, and Kmai, *female*, appended to the noun Egj.

Masculine.

Feminine.

Manyong, *an elephant* ; Manyong nga long, Manyong Kmai.

Toppu, *a tiger* ; Toppu nga long, Toppu Kmai.

Kampai, *a goat* ; Kampai nga long, Kampai Kmai.

Leh, *a hog* ; Leh nga long, Leh Kmai.

The only exception to this rule occurs, as we have noticed also in the language of the Taying Mishmis, in the case of the domestic fowl Kai. *Male*, Kai apai. *Female*, Kai Kmai.

Number.—The noun admits of no plural form, in those instances in which the noun does not express a collective or a plural idea, a numeral added to it renders the expression sufficiently intelligible.

Ngang, *a goose*; Ngang ngun, *eight geese*.

Klan, *a flower*; Klan Kaplak, *all the flowers*.

Case.—There are no inflections in the language used for representing the various relations of nouns usually termed cases.

The expression of the Genitive case depends only on the juxtaposition of the two substantives, of which the former is understood to be in the Genitive.

Wa lap, *The leaf of the bamboo*.

Sabu yop, *The child's hand*.

The other cases are marked by the use of post positive particles.

Of Adjectives.

An adjective generally follows a substantive; as Manchu Ka-im, *a black cow*; K ang ga K hrang, *a long horn*.

There are no terminations to mark the degrees of comparison. But as the comparison of one person or thing with another so as to ascertain the relative quality possessed by each, must necessarily exist in some form in every language, we find that the general mode of forming comparisons in this, is merely by placing the adjective after the noun with which the comparison is made; Ke an Ktchong Kashyung, *I am leaner than this man*; or literally, *I this man lean*.

¹We ²no ³among ⁴Kam, ¹He ⁴has ³more ²(than) ²you.

Kadun, *much or very* is often added to an adjective to express a quality as existing in the highest degree.

Si Kamcheng Kadun, *The water is very cold*.

Numerals.

The following is the cardinal series of numerals adopted by the Mi jhu Mishmis.

- | | |
|------------|------------|
| 1. Kmo. | 6. Katham. |
| 2. Kaning. | 7. Nun. |
| 3. Kacham. | 8. Ngun. |
| 4. Kambum. | 9. Nyet. |
| 5. Kalei. | 10. Kyep. |

Kyep ma Kmo, 10 and 1.

Kyep ma Kaning, 10 and 2.

Kyep ma Kacham, 10 and 3, &c.

- | | |
|------------|----------------|
| 20. Ketag. | 30. Sung gyep. |
| 40. Brisi. | 50. Ngrunsi. |
| 100. Waye. | 1000. Kannu. |

There are no ordinals in the language.

Of Pronouns.

Gender has no place in the personal pronouns of this language, nor do they undergo any variations indicative of *Case*. As far as they are used as substantives, they admit of the addition of post-positive particles as in the case of nouns. As pronouns in ordinary discourse are frequently introduced without that connexion which could enable the hearer instantaneously to decide, whether one or many were intended, a mode has here been adopted to determine this independently of the connexion, and in consequence, the people make use of the termination *Thal* to express the plural number.

The personal pronouns are—

<i>Singular.</i>	<i>Plural.</i>
1st. Ke, <i>I</i> .	Kethal, <i>We</i> .
2nd. No, <i>Thou</i> .	Nothal or Nonethal, <i>Ye</i> .
3rd. We, <i>He or she</i> .	We thal or Vethal, <i>They</i> .

The demonstrative pronouns are, *An*, *This* and *Pehai*, *That*.

The interrogative pronouns are, *Hoina*, *Who?* *Asan manai*, *Which?* and *Sindoi*, *What?*

I am not aware of the existence of any relative pronouns in the language. This deficiency is supplied in the same manner as in the language spoken by the Taying Mishmis.

Of Verbs.

The moods and tenses of verbs are expressed by means of particles or significant words appended to the verbal root; but number and person are distinguished by no modifications.

INDICATIVE MOOD.

Present.

The verb in its simple state is often used as the form of the present tense, e. g.

Ke ndat, *I call*; No gap, *Thou fightest*; We gya, *He runs*.

To express a more definite signification, the word *Meng* is added as an auxiliary; thus,

Ke ndat meng, *I am calling*; No gya meng, *Thou art running*; We gap meng, *He is fighting*.

Past time is denoted by the addition of the particles Ga for the Imperfect, and Kong for the Perfect Tense.

Ke ndat ga, *I did call*; Ke gap ga, *I did fight*; Ke gya ga, *I did run*.

We ndat Kong, *He has called*; Gap kong, *Has fought*; Gya kong, *Has run*.

Future. Iung added to the verb denotes future time.

Ke ndat iung, *I shall call*; We gap iung, *He will fight*; No gya iung, *Thou wilt run*.

There is no particular form to mark the Gerund, but in all ordinary cases, it is the verb in its simple state followed by another verb. Thus; Vethal tamy in vitch sup-kong, *They have purchased the salt to sell it, or for the purpose of selling it*.

THE IMPERATIVE MOOD

which exists only in the 2nd person is indicated by the addition of Chu to the verbal root.

Khai chu, *Speak!* Groin chu, *Lift it up!*

¹Kesa ²maisa ³kaplak ⁴mai ⁵jai ⁶thai-chu,

³All ¹you ²boys ⁶and ⁴girls ⁵go ⁶and ⁴dance ⁵and ⁵sing.

Prohibition is expressed by prefixing Aí to the root; thus, Aí khai, *Do not speak*; Aí ngái, *Do not weep*; Aí mui, *Do not sleep*.

Simple Negation is expressed by prefixing Má to the root. Thus; We má lap, *He does not sit*; Kwe má chak iung, *The dog will not bite*.

POTENTIAL MOOD.

Power or capacity is usually expressed by Non-niu added to the verb. We rung brü non-niu, *He can break the boat*; No jai non-niu, *You can sing*.

In the *Negative* form Má is prefixed. Ke mai má non-níu, *I cannot dance*.

Particles.

When a question is asked, the interrogative particle I is commonly used, except when any other word in the sentence implies an interrogation.

Wa jai-meng, tyat ma i? *The birds are singing, do you not hear them?*

No chi swí i? *Are you afraid of a mouse?* An na bang? *Whose cloth (is) this?* Ke gang na la kong? *Who has taken my bow?*

Adverbs generally precede the verbs they serve to qualify.

To nit, *To-day*; Mangane, *Yesterday*; Terung, *To-morrow*. Na-chang, *Slowly*; Ukai *Quickly*; Layim, *Yes*. Mka, *No*; Yahetai, *Where?* Chendo, Siga, *Why?*

The particles that take the place of Prepositions in this language usually follow the nouns they govern.

Sentences.

¹An ²thong ³ho, ³Come ²and ¹see ¹this.

¹Chohun ²miro ³sal ³chu, ³Bring ¹Chohun ²with (you).

¹An ²tang ³klaú ⁴na ³phi-kong? ³Who ⁴has ¹given ²you ²this ²spear?

¹Heram ²vitch-kong, ¹Heram ²sold ²it.

¹Mangane ²techim ³kmo ⁴chat-ga, ¹Yesterday ⁴I ³killed ²a ²wild ²hog.

¹Ti ²kong ³ti ³thong-chu, ³Fetch ²some ²water ²from ²the ²water ²ghaut.

¹Bli ²la ³ho i? ³Will ²you ¹come ¹into ¹the ¹house?

¹Nkhar ²li ³ktchong ⁴ma ⁵chak, ⁶yahctái ⁷thai-kong,

⁵There ⁴are ³no ²men ¹in ⁶the ⁷village, ⁷where ⁷have ⁷they ⁷gone?

²Kom ³chat ³thai-kong, ³They ²have ¹gone ¹to ¹kill ¹a ¹bear.

¹Tonit ²an ³nga ⁴Tam ⁵thongga, ⁴Tam ⁵brought ²this ³fish ¹to-day.

VOCABULARY.

<i>English</i>	<i>Ta-ying Mishmi.</i>	<i>Mijhu Mishmi</i>
Air	Hzung	Mbaong.
All	Su-mive	Ka-plak.
Anger	Khomí	Sot-do.
Ant	Pa-swi	Cha kri.
Arrow	Mpo	Lo wát.
Ashes	Mgó	Da-moung.
Ask	Hahona	Wyet-chu.
Aunt, <i>Pat.</i>		
<i>Mat.</i>		

<i>English.</i>	<i>Ta-ying Mishmi.</i>	<i>Mijhu Mishmi</i>
Back	Mpling	Glok.
Bad	Prám	Mphan.
Bag	Kapleḥ	Tapái.
Bamboo	Hweí	Wa.
Basket	Ka-le	Hó.
Beads	Ari	Krón.
Bear (n.)	Tahum	Kom.
Beard	Thrung-mung	Ha-mou.
Beat	Ab-bana	Phong chu.
Bead	Ipo-áng	Má.
Bee	Ta bi-ye	Sing glak.
Beg	Tha chi na	Gajai ja mong.
Belly,	Klita pum	Ndak.
Betlenut	Gowe	Tarsi-chyet.
Bird	Mpía	Wá.
Bite	Thug-na	Chak-Chu.
Bitter	Ká	Hám.
Black	Ma-kwa	Ká im.
Blood	Rhwei	Vi.
Boat	Ro-wang	Rung.
Body	Mtho	Chai.
Bone	Lu bung Lubra	Zak.
Bow (n.)	Arri Kan	Gang.
Brass	Kha chi	Ta-nai.
Break	Hjo-na	Bru-chu.
Broad	Ii eḥ	Pat-ge-thai.
Brother (<i>elder</i>)	Na-fo	Tchepmai.
Brother (<i>younger</i>)	Pamyó	Gotwoi.
Buffaloe	Ma-ji	Tal-loi.
Burn	Pwe-na	Ru-nga-chu.
Bury	Mung-chona	Kam-tha-chu.
Call	Ame-na	Ndat-chu.
Cat	Majari	Jámi.
Catch	Ro-na	Choung-chu
Check	Tyiopo	Mlrup.
Child	Agemung	Sa-bú.

<i>English.</i>	<i>Ta-ying Mishmi.</i>	<i>Mijhu Mishmi.</i>
Chin	Thano	Maha.
Cloth	Ka-jem	Bang.
Cloud	Anying	Ne-ou.
Cold	The-a	Kan-cheng.
Come	Honna-na	Hoi-chu.
Cook (v.)	Hi-a-na	Tchyot-chu.
Copper	Proi	Khyok.
Cow	Ma-chu	Man-chu.
Crooked	Gawe-ya	Kai-ku-kaiko.
Crow (n.)	Chak-lá	Wa-ha.
Cry	Khro-na	Ngai-chu. °
Cut	Te-na	Njang chu.
Dance	Bui-na	Mai-chu.
Darkness	Kano	Báng-lá.
Daughter	Ayia	Kmai-Shá.
Day	Ki-hing	Songla.
Deaf	Nkru-na-Káppá	Ing-kom-bong.
Deep	Rum-ma	Gatháng.
Die	Siyoge	Ka-si-le.
Dig	Thuna	Leh-chu.
Dog	Nkoe-Nokwe	Kwe.
Drink	Chumma	Thang-chu.
Dry (adj.)	Soi-ya	Ge-sar.
Duck	Tkhréng-bu	Kai-pet.
Ear	Nkru-ná	Ing.
Earth	Thli	Nyai.
East	Te thi-yang	Lóng.
Egg	Máye	Chet.
Elbow	La-Ku	Rok-slong.
Elephant	Amieng	Mányong.
Eye	Mollom	Mih.
Face	Mi-nya	Ringa.
Fall	Ga-lya-na	Du-chu.
Far	Dyáu	Klam.
Fat	Dong-ya	Ka-shyot.
Father	Na-bá	Ke-pai.

<i>English.</i>	<i>Ta-ying Mishmi.</i>	<i>Mijhu Mishmi</i>
Fear (v.)	Ri-de-na	Sui-mang.
Feathers	Mung	Bá.
Fight	Toe-na	Gap-chu.
Finger	A-twi	Yop-dom.
Fire	Na-ming	Mai.
Fish	Tan	Nga.
Flower	Tappul	Klau.
Foot	Mgrung	Mplá.
Forest	Ha-bo-an	Kanan.
Forget	Wemsaya	Lamatko.
Frog	Ta-pwa	Nkhang.
Fruit	Chi	Chep.
Get	Tingyá	Than-chu.
Girl	Míá-á	Mai-sa.
Give	Hong-na	Phi-chu.
Go	Bona	Phai-chu.
God	Nging-ya (?)	Se-lap.
Goat	Ma-bie	Kam-pai.
Gold	Paddei	Som.
Good	Pra	Ga-chit.
Goose	Tkhrong-chi	Ngáng.
Grass	Ta-re	Roh.
Great	Drung	Ka-tái.
Hair	Thong	Chám.
Hand	Htyoa	Yop.
Hard	Tal-li-ya	Kong-mang.
Hate	Ka-pú-de-na	Ga-chok-chu.
Have	An	Kám.
He	Mta	We.
Head	Mkau	Kou
Hear	Pha-rong-na	Tyat-chu.
Hill	Thiá-Maia	Neng-tan.
Hog	Báli.	{ Leh (<i>domestic.</i>) Techim (<i>wild.</i>)
Horn	Ru	Kang.
Horse	Grue	Kom-beng.

<i>English.</i>	<i>Ta-ying Mishmi.</i>	<i>Mijhu Mishmi.</i>
Hot	Tia	Kyem.
House	Ong	Bli.
Husband	Ha-mawa	Ke-ro-wai.
I	Ha	Ke.
In	Kwa	Li-Lá.
Iron	Tsi	Teng-gri.
Ivory	Ta-meng-lang	Men-yong-chí.
Kill	Se-kwon-de	Chat-mi-chu
Kiss (v.)	Do-ná	Yup-chu.
Knife	Nhwa	Soit.
Knee	Fa-bung	Pat-pau •
Know	Kasai-a	Kong-nyet.
Laugh	Mara-a	Krep-chu.
Little	Go-chwá	Metham. •
Light (n.)	Soná	Songla.
Lightning	Ablú	Mphrá.
Look	Kátho-na	Thong-cha.
Long	Kalong	Gakhrang.
Mad	Kappa	Karua.
Man	Nme	Ktchong.
Many	Ndü	Kadnu.
Mat	Tahrü	Sin.
Medicine	Ta-ma	Ta-si.
Milk	Nye-chi	Chynn.
Monkey	Tamium	Muh.
Moon	Hlo	Lai.
Mother	Ná-má	Nu-nu.
Mouth	Ku-kwen	Njyut.
Name	Amung	Lámong.
Near	Mgáh	Aliroh.
Neck	Pa-húng	Hóng.
Nest	Pya-an	Wa-sa.
New	Moye	Gotan.
Night	Ya-bo	Búnglá.
No!	Sam	Mka.
Noise	Tyakwo	Lót.

<i>English.</i>	<i>Ta-ying Mishmi.</i>	<i>Mijhu</i>
North	Ha-piye	Kampeyn.
Nose	Hnyá-gom	Min-yong.
Oil	Tou-chi	Na-man.
Old	Me	Gothung.
Open	Kana	Yat-chu.
Paddy	Ke	Hál.
Place (v.)	Cho-na	Tha-chu.
Plant (v.)	Lena	Lap-chu
Plough	Sipla	Thai
Pull	Mago-na	Gang-chu.
Push	Nyung Hlia-na	Lat-chu.
Quarrel	Khogahá-na	Maha-chu.
Quickly	Chyamte	Ukai.
Quietly	Beh-mte	Nachangui.
Rain	Kara	Buwang.
Raise	Dwe-na	Gro-in-chu.
Rat	Ka-chi	Chi.
Ratan	Lakká	Lamai.
Rice (<i>cooked</i>)	Tapoye	Set.
„ <i>uncooked</i>	Ke-kou	Ha-ku.
Ripe	A-hungya	Kasum.
Rise	Dwena-na	Long-chu.
River	Ma-chi	Ti-taem.
Road	Alyim	Blo-ong.
Run.	Chu-na	Gya-chu.
Salt	Plá	Ta-myin.
Sand	Tappi	Ka-chen.
See	Ka-tho-na	Thong-chu.
Seek	Mla-na	Hong-chu.
Sell	Teo-na	Vitch-chu.
Short	Ka-tyoá	Ga-thi.
Shut	Ta-kwe-na	To-kwe-chu.
Silver	Pau-eng	Rupái.
Sing	Ta-se-na	Jai-chu.
Sister (<i>elder</i>)	Na-bi	
„ <i>younger</i>	Ma-thié	

<i>English.</i>	<i>Ta-ying Mishmi.</i>	<i>Mijku Mishmi</i>
Set	Dena	Lap-chu.
Skin	Kwa	Wong.
Sleep	I-na	Mui-chu.
Slowly	Beh-e	Nachang.
Small	Che-ka	Karusa
Smoke (n.)	Naming-khu	Mai-hut.
Snake	Ta-bu	Zhú.
Son	Aye-wa	Sha.
Soul	Ta-we	Hang Mehim.
Sour	Hru-wa	Churr.
South	Ha-chua	Kam-dong. •
Speak	Atya-na	Khai-chu.
Stand	Dwe-na	Long-chu.
Star	Ká-ding	Maji.
Steal	Oku-na	Rohu-chu.
Stone	Mphlá	Laung.
Stop	Kalyo-na	Long-chu.
Strong	P-eú	Kam-blau.
Sun	Ring-Nging	Lemik.
Sword	Togo-Sambe	Sambe
Spear	Tappa	Tang-Klau.
Sky	Ning	Tep-chyok.
Take	Che-na	La-chu.
Thunder	Búrra	Tomok.
Tobacco	Dhuá	Yamum.
Tooth	Lap	Tsi.
Tree	Machom	Chang-to.
Village	Má-tyung	Nkha-yeng.
Uncle (<i>pat.</i>)	Nada	Ua-pong.
„ <i>mat.</i>	Na-ku	Ke-yup.
Want	No-a	To-en-chu.
War	Mre	Et.
Water	Má-chi	Ti.
West	Holla	Sam.
White	Leowa	Kam-phlong.
Wife	Hanya •	Ke-kmai.

<i>English.</i>	<i>Ta-ying Mishmi.</i>	<i>Mijhu Mishmi.</i>
Wind (n.)	Hzung	Mbá-ong.
Woman	Miá	Kmái.
Wood	Barong	Sang.
Work (v.)	Khree-mu-ba-na	Se-nam-ha chu.
Year	Ka-nung	Laoma.
Yes	Omam	La-yim.
Young	Msa-bre	Yong-sa.

Notes on ancient Inscriptions from the Chusan Archipelago and the Hazara Country.—By Bábu RÁJENDRALÁL MITTRA, Librarian, Asiatic Society.

The accompanying plate (XV.) contains facsimiles of three inscriptions lately submitted to the Asiatic Society. The first two are from Putu in the Chusan Archipelago and are interesting as affording traces of Buddhism in the remote isles of the China Sea. Mr. Townsend Harris of the American Consulat at Ningpo, to whom I am indebted for an opportunity of examining facsimiles of these records, informs me that the island, whence they are brought, is covered with the remains of monasteries, temples and hermitages, and held in great veneration by the Chinese. As a place of pilgrimage its reputation was at one time sufficient to attract the presence of the Emperor Kanghi to its shores, and even to this day, no females are allowed to land on it, lest they should defile it by their presence. The inscriptions were found recorded on granite tablets on the road side, about two hundred yards apart from each other.

The substance of the first inscription (Plate XV. No. 1) is the well known Buddhist formulary "Om Manipadmé hum," written in Sanskrita and Chinese characters. The second (No. 2) includes the same formula along with two other invocations, with the heading "*tryam*" triplet. The Sanskrita characters of both are of the 7th century of the Christian era, and bear a strong likeness to the modern Tibetan. There seems, however, to be a slight difference in the style and cut of the letters which induces me to think the first inscription to be somewhat older than the second.

The words of the triplet are :

Om Aripachani hrih.

ॐ नमो भगवते वासुदेवाय

॥ ५ ॥

ॐ मणि पद्मे हूँ

ॐ नमो भगवते वासुदेवाय

7^1 T^3 77 77 77 77 77 77 77
 77 77 77 77 77 77 77 77 77 77

Om Manipadmé hum.

Om Vajrapáni* hriñh.

The first line is apparently the Vija-mantra or formula sacred to a Bodhisattva of the name of Aripachani, the second, according to Mr. Hodgson, is the Vija-mantra "of Padmapáni the *præsens divus* of the theistic school of the Buddhists," and the third of Vajrapáni, the third celestial Bodhisattva and lord ascendent of the last preceding age.

The most peculiar characters of the formulæ are the syllables ह्रीः *hrih*, ह्रं *hum*, and ह्रिंः *hriñh*, but of their meaning nothing satisfactory can be made out with the aid of the Sanskrita Dictionary or Grammar: they are evidently mystic emblems and perfectly independent of all lexicons.

Georgi in the Alphabetum Tibetanum, M. Klaproth in the Journal Asiatique, and Professor Mill and Mr. Hodgson in the pages of this Journal have discussed at great length the import of the first inscription, and the first three are of opinion that the particle *hum* is equivalent to the Sanskrita *tathāstu*, and the English Amen. This opinion is supported by the author of the *Medini* who explains *hum* with the word *abhyānujñā* "assent," or "permission," and there can be no question that that is the true meaning of the word when used in common composition; in connexion with vijamantras, however, we venture to think the meaning is different. The particle in the second inscription is in the same position with the words *hrih* and *hriñh* and appears to be almost convertible, and yet the latter have as yet found no place assigned to them in any Sanskrita dictionary. In the *Kriyā-saṅgraha*, seventeen† different particles are used to convey

* The penultimate letter appears more like प्य *pya* or स्य *sya* than पा *pá*, and the name may possibly be Bajrasattva, but the last letter being distinctly a न *na*, I think the inscription has received some scratch under the letter in question, and that it is a पा.

† ॐ वक्षसत्त्व-हं ॐ रत्नवक्ष-चां ॐ धर्मवक्ष-ह्रीः ॐ कर्मवक्ष-स्यः
ॐ वक्षराज-जः ॐ वक्षराग-हाः ॐ वक्षसाधु-सः ॐ वक्षरत्न-ॐ
ॐ वक्षतेज-आः ॐ वक्षयक्ष-हं ॐ वक्षहास-हां ॐ वक्षधर्म-ह्रं
ॐ वक्षतीक्ष्ण-धं ॐ वक्षहेतु-मं ॐ वक्षभास-रं ॐ वक्षकर्म-कं ॐ
वक्षसन्धि-वं

the same idea in connexion with the name of Vajrapáni which *hum* does with reference to Padmapáni in the inscription before us. The word is sometimes used by itself, as in the *Durgati Sodhana Avadāna*, where the repetition of the mystic *hum* four times is said to be a preventive of all evils.* But it is in the *Vijachintāmaṇi* where we find the most conclusive proof of these terms being symbolic of some divinity, and in no way amenable to the rules of philological construction. The 4th section of that work states† that *h* is a representative of the sky, *m* of Śiva, *u* of Sakti and the semilunate nasal mark *nāḍabindu* of the dispenser of salvation, and these letters together constitute the emblem *hum*. *Hriṅh*, according to that authority, is emblematic of Śiva, Vishnu, the presiding deity of the crown of the head, the Yoni, and the dispenser of Moksha.‡ *Ghain*, *Srim* and a host of other particles are explained in a similar way.

Nor is this mode of typification opposed to the practice of the Hindus. The idea of using a literal symbol to designate the Deity's self, first originated with the Brāhmins, and the most ancient term of its kind is no doubt the Vedic Om. It is the great instrument of Brāhminic devotion, and may be assumed to be the archetype of all the symbolical terms used by the people of India whether Brāhminists or Buddhists. Śākya Sīṃha early imported it into Buddhism and his followers have ever since used it to indicate the Supreme Adi Buddha or whoever may be the prime source of all intelligence.§ The Jains not only adopted it, but coined a new term *Em* to devote the female

* युक्तचतुर्भिर्हकारैः प्रयुक्तः सर्वकर्म्मसु । कुलत्रयेषु सामान्यः क्रोधो ह्यष्टतनु-
च्छदो । सर्वविघ्नविनाशाय गुह्यकाधिप्रभावितः । *Durgati Sodhana Avadāna*,
Asiatic Society's MS. No. 817, folio 15, p. 1, line 12.

† सर्वविघ्नहरं देवि हकारं व्योमचक्षुकम् । सर्वपापहरं देवि मकारं शिवरूप-
कम् । जकारं परमेशानि शक्तिरूपा मनातनी । महाभोजप्रदं देवि नादविन्दुं
सुदुर्लभम् ॥ ॐ ॥ *Vija-chintāmaṇi*, 4th patala.

O Devi the letter *ह* (h) called Vyoma or the sky, destroys all evils, and the letter *म* (m), which is a manifestation of Śiva, purifies all sins; the *ज* (j) is the embodiment of Sakti called *Sandāni*, and the *ॐ* (cerebral nasal mark), O Devi, is the dispenser of Moksha.

‡ शिवरूपं हकारश्च रेफो विष्णुर्न संशयः । ईकारं सूक्ष्मो साक्षान् योगि-
योऽथ सुरेश्वरि । नादविन्दुं महेशानि साक्षान्मोक्षप्रदायकम् । ॐ । *Ibid*.

§ Memoires concernant l'Histoire, &c. des Chinois, V. p. 59.

energy or efficient cause of the Universe, Om being, according to them, a representative of the Omniscient as quiescent and unconnected with the world.

Among Buddhists, following the well known law of phonology² whence arises the cockneyism of aspirating initial vowels, Om, we imagine, readily passed into *Hum*, and when the seed for multiplying mystic symbols was once thus thrown on a soil so pre-eminently favourable to the development of fancy as is supplied by the Indian mind, not only did the original emblem of the Deity undergo the most phantastic transformations, but the whole of the Sanskrita alphabet* was put into requisition to supply materials for esoteric symbols of divinity. The Bráhma followed in the wake of the Buddhist, and no ordinary care was taken to assign these new terms to appropriate deities and invest them with the most extraordinary attributes. The greater portion of the *Gyut* or the last division of the *Kahgyur* is devoted to this object, and the Tantras of the Bráhmans are replete with the most varied forms of Mantras. In some instances these symbols are extended to most unwieldy proportions. The Vijamantra of Syámá, a form of Durga, according to the *Mahánirván Tantra*, is “Kriñ kriñ kriñ hóm hóm hriñ hriñ Dakshine Kálíke kriñ kriñ kriñ huñ huñ hriñ hriñ swahá” [क्रौं क्रौं क्रौं ह्रं ह्रं ह्रीं ह्रीं ह्रीं दक्षिणे कालिके क्रौं क्रौं क्रौं ह्रं ह्रं ह्रीं ह्रीं साहा]; that of Bhadra Káli is, “Haum Kali, Mahákali, kili kili phat swáhá” [हौं कालि महाकालि किलिकिलि फट् साहा]; that of Kátyáyani “Aim hrim srin chaum chandikáyai namah,” [ऐं ह्रीं श्रीं चै चण्डिकायै नमः]; that of Narahari “Am hrim khaum hum phat” [अं ह्रीं चै ह्रं फट्] that of Tvaritá, “Om hrim hum khe cha chhé kha stri hum kshe hrim phat” [ओं ह्रीं ह्रं खे च खे च खौ ह्रन् स्त्री ह्रीन् फट्]।

* अकारादिचकारान्ता माहका वीजरूपिणी ।

विसर्गश्चैव विन्दुश्च त्रिविन्दुर्ब्रह्मविषयः ॥

वर्षानु जायते ब्रह्मा तथा विष्णुः प्रजायते ।

चन्द्रश्च जायते देवि जगत्संहारकारकः ॥

The letters अ to च of the alphabet are mystic emblems (Vija); the visarga, the *vindu*, and the *tribindu* are manifestations of Brahma and Vishnu : from them, O goddess, proceeds Rudra the destroyer of the world; from them proceedeth Brahmá. *Vijachintámani*, I. Patala.

From an attentive examination of these and such like mantras and the religious terminology of the Bráhmans to which the Buddhists are very largely indebted, it appears that the phonetic particles which constitute the peculiar characteristic of mantras are crude terms, coined to indicate the essence of the divinities to whom they are assigned and to stand as their representatives. They are formed generally, though not invariably, by the addition of the *anuswar* or the *visarga* or both to single or compound consonants, and are used either singly instead of the name of the gods or goddesses to whom they are sacred, or in connexion with their names as compound terms, without being subjected to any grammatical regimen. When inflections are used the names are put in the nominative, the accusative, the locative or the vocative case, the meaning being in the three former cases that the emblem stands for or exists in the divinity of that name, and in the latter a mere interjection. The use of the locative, however, is confined among the Buddhists. In mantras adapted for the destruction of enemies, or for the neutralization of poisons,—the name of the god to whom they are addressed is generally put in the nominative case; but this construction is confined to the mantras of the minor divinities.

According to the above deduction the three formulæ of the inscription may be explained as follows :—

1st. Om the deity is in Arapacháni who (or whose emblem) is hrih.

2nd. Om the deity is in Manipadma who (or whose emblem) is in hum.

3rd. Om the deity is Vajrapáni who (or whose emblem) is hriñh.

Both the Buddhists and the Brahman regard their *vija mantras* with the greatest veneration as the most sacred emblem of the Deity, but while the former, actuated by the exclusive spirit of their religion, hold out the most dreadful imprecations against him, who should venture to repeat a *vija mantra* in the presence of a fellow-man, the latter proclaim it every where and at all places, alike on the road side and at the market place, as in the vihára and the closet, and in the same breath invite the most revered Lámá and the detested Chandála to avail themselves of its aid, and secure for their erring souls, immediate and eternal salvation.

No. 3 of Plate XV. is the facsimile of an inscription found by Capt. Pearse, of the Madras Cavalry, in a small mound in the village

of Shah Dhairi, on the high road from Rawal Pindi to Hazara. The record was originally inscribed on a narrow slip of copper $9\frac{1}{2}$ inches by $\frac{5}{8}$ ths of an inch, which has been, apparently by some accident, broken into four fragments; the characters are Arian and the language is Páli. I have seen a tentative reading of this by Mr. E Thomas, of the Civil Service, in which occur the words "*Ayanachandra*," "*viveka*" "*viphala*," but have not as yet been able to make out its purport.

Account of a visit to the Shrine and town of Sakhi Sarwar in the Lower Deráját; with a notice of the annual Melá or Fair held there.—By Lieut. H. G. RAVERTY, 3rd Regt. Bombay, N. I. Asst. Commissioner, Múltán.

"Friends of my heart, who share my sighs,
Go seek the turf where Kásim lies,
And woo the dewy clouds of spring,
To sweep it with prolific wing.

Within that cell, beneath that heap,
Friendship, and truth, and honour sleep,
Beneficence that used to clasp,
The world within her ample grasp."—HASAN-AL-ASSADY.

In the month of April, 1853, whilst stationed in the Deráh Ghází Khán district, I took the opportunity of paying a visit to Sakhi Sarwar, a small town celebrated for its famous Shrine bearing this name—situated on the western skirt of the mountains, the continuation of the Súlímán range; and where an annual *Melá* or Fair is held, which is attended by several thousands of people.

The Fair commences from the first of *Bysákh*—the first month of the Hindú year, and continues during the two following days. On the year in question, it fell on the 9th, 10th, and 11th of April; and people—both Hindú and Mussulmán—with their families, were flocking to it from Sindh, Bháwalpúr, Jesalmír, and even as far east as Delhi, as well as from all parts of the Panjáb.

They at first assemble in the town of Deráh Ghází Khán; and on the two last days of the month of *Chaitr* they commence their journey. The first stage is by Chowrutta to Vidor or Widor, a distance of about eighteen miles, as far as which water is procurable. Here they

halt for the night, it being necessary that they should reach the end of their journey on or before the morning of the first of *Bysakh*.

On a reference to my notes, I find that I left Deráh Ghází Khán, accompanied by that fine old veteran Malláh Khán, a Resáldár of the Deráját Mounted Police, and two Sowars of the same corps, at 2 P. M. on the 9th April; and reached Chowrutta, a small village to the left of the road at half-past 3. The whole of the way from Deráh to this place, a distance of about nine miles, was one continuous string of camels with gaudy trappings, ponies, horses, and bullocks, besides crowds of foot-passengers, all hastening to the Fair.

“The roads were clad frae side to side
 o Wi’ monie a weary body,
 In droves that day.”

There were men, women, and children; but by far the greater number—as usual on such occasions—were young women in *Kajá-wahs* or litters on camel’s backs; and numbers of them were exceedingly pretty. All seemed in high spirits, and roguishly inclined, if we may judge from the sparkling glances of their dark eyes.

The same scene occurred as far as the village of Widor—another nine miles,—which is about half way, and where I arrived exceedingly thirsty at about 5 P. M. The water here is horrid, and is as black as ink; in fact the sight of it is almost enough to give one the plague. As I have said before, I was very thirsty, and there being no time to mince matters, I was obliged to take a dose, which I managed by holding my nose with my fingers, so as to at least get rid of the smell, if I could not of the flavour.

The people, that is to say the fair-going ones, halt here for the night, on account of there being no water between this and Sakhi Sarwar, a distance of about sixteen miles, with the exception of small quantities procurable from the Belúchís who station themselves along the road and dispose of it at about a half-penny per cup.

I had left the old Resáldár and one of the two Sowars (who were rather sparing of their horses) behind, between Chowrutta and Widor; so I set out from the latter place with one Police horseman, and four Belúchís of the Laghári tribe, furnished by their chief—Jellal Khán—in whose district we then were. We passed through a bare and desert tract of country gradually approaching the hill,

to the west, which are perfectly bare, and to all appearance different to any I had ever seen, inasmuch as they seemed, from their singular abruptness, to be almost inaccessible. About two miles distant from Widor we came upon stones and pebbles, and a peculiar clay which from its great hardness might be mistaken for stone. This is mere debris from the hills forming as it were a belt of some eight or ten miles in breadth that joins and runs parallel to the rich alluvial soil of the Indus, which on the right or western bank is about twenty miles broad on the average.

We now passed the remains of a well which that popular ruler—Dewán Sáwan Mall, Názim of Múltán—attempted to sink for the convenience of the visitors at the *Melá* or Fair, but without success, having found it impracticable after employing workmen on it for about a year. It now appears like the remains of a tank. Some four miles from the end of our journey, to the left of the road, there is a platform of stone and lime, built by one of the votaries of Sakhi Sarwar, round an aged tree. It is said that this tree remains in leaf for twelve years at a time, and for a similar period bare and blighted. The ninth year of its blight has passed, and in another three, *they say*, it will again put forth leaves. By all accounts, however, it appears that the tree has been dried up in this state for the last fifteen years or more. The trunk contains several iron nails or pegs, which have been driven in by deluded people having some wish to be fulfilled. It is usual to drive in a nail one year, and the year after, if the desired object has been acquired, to come and draw it out again. The Hindús have also plastered over the trunk with red lead in the same manner as they are in the habit of anointing their gods. When they reach the tree they make their prostrations to it calling out the name "*Laali wallah*,"* not Sakhi Sarwar; for they say that four rubies are suspended over his tomb, but they are not visible to mortal eyes. They continue to cry out to the Saint by this name of *Laali wallah*, and singing their hymns proceed towards his Shrine.

On leaving Widor, the sky away in the north-west was dark and over-cast, and threatened rain, which came on with violence, shortly after the sun set and attended with gusts of wind, and vivid flashes

* *Laali wallah*—from لعل—a ruby, and آلاء—a master, possessor, etc.

of lightning. There was no remedy but to make for a small clump of trees, which fortunately happened to be within a short distance; and with the shelter afforded by the ample blanket of the Police horseman—A Kanker Afghán—who with myself in the middle and my four Balúch guides with our horses huddled together in a line—those on the right and left, holding the ends of the blanket, and each holding it over his own head—we managed to hold out for some time, until the blanket got wet through, when the storm luckily passed off; and we again went on at a brisk pace to make up for lost time, as night was fast approaching.

The road became more stony and more difficult as we advanced, from the streams of water and the increasing darkness, which was only at times relieved for a moment by a vivid flash of lightning, very often disclosing our dangerous proximity to a ravine or water-course. However we succeeded in reaching the end of our journey (Sakhi Sarwar at that time of night appearing a very strange looking place) without further accident at about half-past 7 o'clock; and I was heartily glad to get into my snug tent, where I found the tea things on the table, and the kettle singing for tea—

“ The very winds that sigh or roar—
 The leaves that rustle dry and sear—
 The waves that beat upon the shore—
 They all are music to your ear :
 It was of use
 To Orpheus—
 He charmed the fishes in the *say* ;
 So every thing
 Alive can sing—
 The kettle even sings for *tey* ! ”

April 10th.—On getting up this morning and looking out, I find I was not deceived in the idea entertained last evening as to Sakhi Sarwar's being a strange-looking place. The town as it may be termed—a collection of flat-roofed mud houses about five hundred in number—is situated on a tongue of land to the left, near the entrance of the Dalánah Pass; and is surrounded by bare and rugged hills on all but the western side. The place just below the town to the north where the Fair is held is rather open. It is the dry bed of a mountain stream, which flows only in the winter

months after heavy rains in the hills; and consists of sand and pebbles with numerous boulders. In the months of June, July, and August, this place must be a second Dádur; and what with the scarcity, as well as the badness of the water, must be fearful indeed. There are a few Kunar, Gaz, and Arák trees in the bed of the river, but with this exception, all around is bare and stony.

That side of the *Zéi'rat* or Shrine, facing the bed of the river to the north, and that to the west, rise abruptly to a considerable height. These two sides are built up in the form of steps, seventeen in number, which are faced with lime and brick—the same materials as the buildings belonging to the *Zéi'rat* (described in a subsequent paragraph) are composed of. These steps answer the purpose of seats for the spectators at the Fair.

The Fair does not commence in real earnest until to-morrow, and from where my tent is pitched I cannot perceive many people. There are however no less than seven whirligigs in full operation; and men and women—boys and girls, take their swing, and seem to enjoy it greatly. There are also several dancing bears and monkeys; and the usual accompaniment of *tom-toms* and other Indian unharmonious musical instruments, whose din and discord seems “to charm the savage breast.” There used to be horse-races in former times; but this amusement has declined of late years, and now is almost obsolete.

Some of the Belúchis here amuse themselves with a very strange and peculiar dance. About thirty or forty assemble together and arrange themselves in a circle, each man with two pieces of wood or two stones in his hand. Then placing the left foot forward they commence to move along in an oblique direction by placing one foot over the other. During the whole time one of the party—generally the one with the best voice—sings one of their rude songs of love and war, the others keeping time by striking these strange castanets together, and joining in chorus. Sometimes they turn round, at others they meet; and having half bent their bodies place both hands over their heads. They then hiss at each other; and having again formed the ring they proceed as before described.

This afternoon, attended by the Resáldár and a few Laghárfí horsemen, I went up the Daláugh Pass into the hills for about nine

miles. The road lies through the dry bed of the river which I have already referred to. It is filled with lime-stone boulders, and in many places is very narrow, particularly about three miles and a half from Sakhi Sarwar, where an immense portion of one of the hills to the right of the path fell down two or three years since, and completely blocked up the road. The second range of hills seem to be composed chiefly of limestone, running slantingly in a south-east direction towards the river; whilst the first or lowest range appeared to be entirely of sandstone. I also noticed in many places boulders of limestone mixed with sandstone, which appeared to be either in a decaying or hardening state. The whole of these hills are perfectly bare; and with the exception of a few patches of green at the foot of the hills through which our path lay, growing from the debris which had collected from above, not a blade of grass was to be seen. There were however a few dwarfish trees and shrubs peculiar to the country scattered about here and there. I went on as far I could conveniently go on horseback, until we reached a *Kotul* or Pass which from its steepness would have been dangerous to have attempted except on the horses of the country. I was now in ROH—the bugbear of the authorities, and the Alsatia of the Derajat—amongst mountains lofty and grand, some of which rise to a height of 1000 feet or more; but the scene wore a dreary, desolate, and gloomy appearance; for even the wild animals and birds appeared to have deserted it. The third or higher range, called the Koh-i-Siāh or Black Mountains, was at a long distance from us, and appeared of immense height.

It is from the bed of this river or torrent, whose windings we have been following, that the whole of the water with which the town of Sakhi Sarwar is supplied—at this period no small quantity—is obtained. The wells, as they are termed, consist of a number of holes or pits dug in the sand, and are about forty in number. The water, which is of a blackish colour and brackish taste, is found at depths varying from ten to fifteen feet from the surface. The strata consists of sand and gravel mixed with pebbles varying in quantity as the depth is increased. During the period of the *Melá*, the attendants at the Shrine make a deal of money by the sale of water, which is purchased from them both by Hindús and Muham-

madans. They fill about a thousand skins besides numbers of earthen vessels beforehand. The price per skin-full the first day, is two annas or three pence English, which increases according to the supply.

Soon after my return this afternoon the sky again became overcast; and towards sunset it came on to blow and soon after to rain, attended with thunder and vivid flashes of lightning, much in the same manner as the preceding evening; and people were now seen running in all directions to the town to escape a ducking. This was most unfortunate, as the fashionable time for the pleasure-seekers appeared to be after 4 P. M., and until long past midnight; but this unfriendly rain has completely damped the sport. The rain cleared off for a short time in the evening; but about 10 o'clock it re-commenced, and continued with violence for the greater part of the night. Knowing the sandy nature of the soil too—for my tent was pitched in the dry bed of the torrent, as I have before noticed—I was momentarily expecting the tent-pegs to come up, when down would have come the whole machine, and probably half-smothered me in the ruins.

12th April.—This being a fine day and the last day of the *Melá* also, I availed myself of the opportunity of taking a couple of sketches of the scenery—one of the town and Shrine of Sakhi Sarwar, the other looking up the Dalánah Pass, already noticed. To the south of the town, the road leading into the Sakhi Sarwar Pass, which is one of the routes to Kándahár through Sewestán and the Pishín valley to Kelát viâ Tull and Dádur, lies over a stony plain for about seven miles before the hills are reached.

It is said that some forty thousand people assemble on the last day of the *Melá*; but I imagine from what I saw this day, that one half the amount would be nearer the truth; still, the number of persons who visit the place during the latter part of March and the beginning of April, cannot be far short of fifty thousand. There is no kind of trade carried on here, such as at what are generally termed Fairs, being altogether of a religious nature; but I think that a commercial Fair might be opened at this time with very great advantage, and with every chance of success. It certainly would be a very favourable opportunity to try the experiment.

The town of Sakhi Sarwar contains about five hundred houses, and about 2,500 inhabitants, out of which number, the attendants at the Shrine, including young and old, amount to 1,650; and who, within the last thirty years, (according to their own account) have never been below or above this number. Each of them, whether "the infant, mewling and puking in the nurse's arms" or "second childishness and mere oblivion," each is entitled to an equal share of the offerings made by the visitors at the Shrine.

The Shrine itself is enclosed within a building with high walls about seventy paces in length and breadth, which is entered by a lofty gateway with minars from the south side. Three sides of the interior are open, but to the north there are two buildings opening one into the other. The eastern one, the pilgrims assemble in: the western apartment contains the tomb of Sakhi Sarwar, which is breast high and covered with a black pall. At the head is placed a green turban over which the visitors strew flowers. On this side, seated on the floor, is the *majawir* or attendant who receives the money, before whom are heaps of copper coins and cowrie shells, which have been thrown there by the humbler class of pilgrims. The larger sums, from a rupee upwards, are placed on the tomb itself. From the personage just referred to, each visitor receives a small string to fasten round the neck, which is made of black lamb's wool, and is considered a powerful charm by the simple-minded people. The Shrine-room is quite dark, and so exceedingly close from want of ventilation and from the oil of the lamps which are continually burning, as to be almost unbearable to any one but a native. The walls too from the smoke from the lamps have become quite black. The whole range of buildings is strongly built of brick and lime.

It is imperative on all pilgrims coming here, to sleep on the ground; and I imagine that such a thing as a *charpai* or bedstead will not be found in the whole place. The reason advanced is, that as the cold earth was the martyr's bed, so must it be the bed of his votaries also.

●

The town also contains about sixty shops, of whom ten are occupied by sellers of sundries, such as needles and thread, women's bracelets, drawer strings, and such like nick-nacks; six sweetmeat-sellers; and the remainder sellers of grain, flour, sugar and ghee

There are no shoemakers or any other artisans, except a few tanners.

In the afternoon of the last day of the *Melá* the visitors begin to draw off, and by the next day the place is deserted. To avoid confusion I left a short time after two P. M., attended by the same party of Belúchis who had accompanied me from Widor, and one Police horseman who acted as my orderly. At half-past three o'clock, having again lost the *Resáldár* on the road, we reached the latter place—a distance of sixteen miles; and after devoting a quarter of an hour to breathe the animals, at the request of my *Laghári* guide, I exchanged the fine mare which had carried me so well thus far, for the one he had ridden, as I had the advantage of being a lighter weight, he taking the mare of another of the party whom we now left behind at Widor. By degrees the party—now consisting of five persons—began to diminish—at first one, and then another dropped behind—and by the time I had arrived within a mile of *Deráh Ghází Khán*, the Police Orderly *Sawar* alone remained with me. We reached *Deráh* at a quarter-past six, having come a distance of thirty-six miles in three hours and a quarter, the policeman's horse having carried him the whole of the way. The Belúch mare too had not done less, for she had carried her master one half, and myself the other half of the distance. Both animals could have gone much farther had it been necessary. This speaks well for the endurance of the horses of this part of the country—celebrated in the writings of classical authors as the land of the *Aswádhyas*—the country rich in steeds.*

The following tradition respecting *Súltán Sakhi Sarwar*, I have extracted from the account of his life contained in a small book, the property of one of the attendants at the shrine, which was kindly lent to me for that purpose.

HISTORY OF SULTÁN SAKHI SARWAR.

"The real name of *Súltán Sakhi Sarwar* was *Suyed Ahmed*, but he is best known amongst his disciples by the former name. His father was *Suyed Zain-ul-Abadín*, bin *Shyed Omar*, bin *Suyed Abd-*

* The *Ossadii* also sent ambassadors tending allegiance. Who these different tribes were, it is not possible to ascertain; their names were apparently Indian. The *Ossadii* may have been the people to the west of the Indus—the *Aswádhyas*, the "rich in horses." Wilson; *Ariana Antiqua*, page 201.

ul-Latif, bin Suyed Shaikah, bin Suyed Ismá'íl, bin Suyed Imám Mousa Kázim, who was one of the twelve Imáms, and the sixth in relation from Alí the son-in-law of the prophet.

"Zain-ul-Abadín—the father of Sakhi Sarwar—was one of the attendants at the tomb of the prophet at Madína. One night in a dream he saw the Prophet standing beside him, who gave directions that he should proceed direct to Hindústán,—the people of which country having lost their road to the true faith, were groping about in darkness—for the purpose of bringing them again into the right path. He accordingly set out for India; and after some time spent on the road, he at length reached the village of Sálkot which lies about fourteen or fifteen miles to the south of the city of Múltán. He first led back the people of this place to the path of orthodoxy; and after residing here for some time, Rehán Khán, Afghán, who entertained great respect and friendship for the Suyed and venerated him for his piety, gave him his daughter in marriage. By her he had two sons—one Suyed Ahmed, known as Súltán Sakhi Sarwar, and the other Suyed Dhodá. After some time he took the daughter of Suyed Abd-ul-Khálík as his second wife, and by her had three sons—Da'oud, Muhammad, and Sohárah. Zain-ul-Abadín at length died, and was buried at Sálkot, above referred to;* and Súltán

* From enquiries made since the above was written, I find that there is a small village near Kotlah Nijábat in the Pergunnah of Múltán, at present known by the name of Sháh Kot, situated about fourteen miles south of the city. Its former name is said to have been *Seh Kot*, (Three Forts) and has been inhabited for the last hundred years; but the three Kots or Forts, from whence its name is derived, are now in ruins.

Near this village there is a place enclosed within four walls, in which there are three *Khánkas* (small domes or chapels) each of which contains a tomb. The first is that of Suyed Zain-ul-Abadín, who died about 670 H.—1271-2, A. D.; the second of his wife Bíbí Ayyá; and the third of Suyed Máhmúd their son. In the month of Asarah (June) a *Melá* or fair, or more properly speaking, an assembly of the votaries of the defunct, is held here, and numerously attended.

Zain-ul-Abadín is said to have had four other sons—one Sakhi Sarwar who died about 690 H.—1291, A. D.; and whose tomb is situated at the village bearing his name, in the hills west of Deráh Ghází Khán; the second Híráh; the third Suyed Da'oud who died at Bokhárá; and the fourth Abd-ul-Ghanní who died at Ramak, a small district near Ghasnói, inhabited by the Lohání Afgháns.

The tombs which are in a very dilapidated state, formerly bore inscriptions in Arabic; but they have long since become entirely defaced.

Sakhi Sarwar, who was remarkable for his piety succeeded to the religious honors of his parent.

“After some time, Sultán Sakhi became desirous of travelling and wandering about the world, as is the custom of such devout persons, in order that they may confer the benefit of their sanctity and piety on others. One day he was seated near the banks of a river (the Chináb probably) when he saw a mare, very thin and weak from great age, grazing at a short distance from him. Perceiving the emaciated state of the animal he said unto her, ‘Graze and become fat;’ and by the favour of the Almighty, after a few days the old mare had improved so much in condition and appearance, as to be even preferable to a younger animal. After some time a water horse came out of the river and copulated with the mare; and from this connection she brought forth a *sammand*, or dun-coloured female colt. Subsequently a person of the neighbouring village happened to discover the mare in the jungle, not only exceedingly sleek and in good condition, but also with a fine colt at her side. On his return home he lost no time in mentioning the circumstance to the owners of the animal, two brothers by name Ahmed and Máhmúd, who also resided in the village. They were much astonished at what he told them, for the mare had become so very weak and thin from extreme old age, as to be useless to any one; and disbelieving what he had told them, they said the beast must have been devoured long before by the wolves and jackals. The man persisted that what he had said was true, and swore by the Prophet’s beard to the truth of his statement. The brothers being now somewhat convinced went along with him, and found that the man’s statement was perfectly correct; and they returned home, bringing the mare and foal along with them. The account of this remarkable occurrence spread far and near, and astonished every body.

“At length Sultán Sakhi himself expressed a wish to purchase the colt; and requested some of his disciples, of which he had now gained a great number, to mention the same to the owners, and say that he would give them whatever price they might ask for it. They went accordingly, and expressed the holy man’s wishes to the brothers; but the unfortunate wretches would not consent to part with this foal under any terms. At length, however, calamity betel

the brothers—sickness and poverty overtook them—and setting this down to the effects of Súltán Sakhí's anger against them for refusing to part with the dun colt, they now came to him, at the same time bringing the animal; and requested he would forgive the past, for that the Almighty had brought all these misfortunes on them in consequence of the Suyed's anger. They were accordingly forgiven; and after having presented a *nazaránah* or present given to a superior, they became the Suyed's disciples.

“ One day Súltán Sakhí mounted on his steed set out unaccompanied from the village, and went to a lonely and desolate place he had selected, where he fasted for a period of forty days. During this period the mare was tied up near by. At this time some people, who by chance happened to pass that way, saw a young man, whose forehead was illumined with the light of piety, and on whose countenance the stamp of sanctity and devotion was impressed, engaged in prayer; and a little on one side of him was a mare which had been secured with head and heel ropes. Now the three pegs to which these ropes had been fastened had taken root, and had shot up into young saplings. On reaching a hamlet which was not far off, they mentioned to the people there this remarkable circumstance, and they equally astonished, and filled with veneration, numbers of them became disciples of the holy man.

“ On the termination of the forty days, Súltán Sakhí set out in company with his new proselytes, for the city of Múltán, which at this time was governed by a ruler known by the name of Ganno. The people of this Prince hearing of the arrival of the *Sarwar** with his followers, reported to their master that a Husaiúf† had arrived there, accompanied by a dun steed which had such eyes as had never been seen in any animals before. The Prince on hearing this account determined to visit the holy man; and taking with him an Irákí horse, and a sum of money as an offering, he set out for the temporary residence of the Suyed. Having presented his *nazaránah* he expected to have obtained in return the dun mare, which indeed was the real object of his visit, and was going at length to demand it of Súltán Sakhí; but the tongue clave to the roof of his

* *Sarwar*,—a prince, sovereign, leader, lord, &c.

† *Husainí*,—the name of a sect, the followers of Husain the son of Alí.

mouth, and he could not utter a word. After some time however he recovered the faculty of speech ; but he took his leave without again attempting to make known his wishes.

“ After the departure of the Prince the Saint’s followers came to him and begged that he would give them the Irákí horse which God had thus bestowed on him, to do what they liked with. He resigned the animal to them ; and they took and slaughtered it, and cooked and ate up all its flesh. The enemies of the holy man who happened to hear of this, went and gave information to the Prince of Múltán, who forthwith sent and demanded back the Irákí steed and the money which he had given. The Suyed, who had become aware of the object of the Prince before the arrival of his messengers, now purified himself, and went out into a solitary place and commenced praying—“ Oh God ! Oh Almighty Father ! thou hast the power to restore the dead to life, as well as to bring the living unto death ! make not this thy unworthy servant contemptible before the wicked and iniquitous !” The horse was forthwith restored to life ; and the heart of Sakhí Sarwar was moreover comforted by the words, ‘ Fear not,’ which greeted his ears from an unseen and invisible speaker. The messengers from the Prince now arrived, and demanded back the Irákí horse together with the money. They were requested by the Saint to go to his disciples and demand them ; and to state at the same time that it was his wish they should be restored. When the Prince’s people reached the dwelling of Sakhí’s followers, to their great disappointment, they found the horse alive, on which they returned to their master ashamed and disgusted. The Prince himself no less displeased at his own conduct, went and begged for forgiveness. The Saint assured him that he entertained no enmity whatever towards any one ; and requested him to set his mind at rest in the matter. The Prince overcome by the forgiving disposition of Sakhí Sarwar, became his disciple forthwith ; and as a proof of his regard for him, he gave our Suyed his daughter—Bíbí Bá’ie—to wife. From this connection a son was born, who was named Rú’i-ud-Dín, better known as Mí’áh Ráná.

Súltán Sakhí Sarwar took up his residence at Múltán, intending to end his days there ; but there is no remedy for mortal man in this Vale of Tears without dying the death :—

“ Believe not Fate at thy command,
 Will grant a meed she never gave ;
 As soon the airy tower shall stand,
 That's built upon a passing wave.” MUHAMMUD AL-TAHMANY.

“ A disturbance now broke out in the vicinity of Múltán ; and it was currently reported that the Kúfirs or Infidels inhabiting the mountains near the Indus—distant some sixty miles to the west—had assembled in great numbers, and had killed and plundered the property of the Faithful residing in that part of the country. This was soon after corroborated by a number of the injured parties appearing at Múltán to make known their wrongs to the powerful Muhammadan chiefs there ; and demand their aid, and that of their brethren of the Faith in general, to enable them to take revenge on the Infidels. Súltán Sakhi Sarwar was one of the foremost to render the succour they sought ; and he accordingly set out to oppose the Infidels, taking along with him his brother—Kháu Dhodá, and Mí'áh Ráná—his son by his third wife, Bíbí Bá'ie—who also accompanied her husband and son. Núr, Omar, Issák, and Alí—his chief and most favoured disciples, together with several horsemen, also went with him.

“ When they had reached the hills where the Zíá-rat or Shrine now stands, they attacked the Infidels and put them to the rout ; and from thenceforth the Saint took up his residence, much against the advice of his followers and friends, at the village where his ashes now repose. After a short period however, the Káfirs again assembled in great force and attacked the holy man and his followers, who opposed them to their utmost, until the four disciples were slain, and obtained the crown of martyrdom. The head of the Saint had been severed from his body by the sword of an Infidel, (may dogs defile the graves of his forefathers and descendants) but the headless trunk, still continued to oppose them for a period of four days. At length, near the skirt of the hills, on a rising ground where the tomb now stands, Súltán Sakhi Sarwar sank down under an Arák tree and breathed his last.”

“ Tyrant of man ! imperious Fate !
 I bow before thy dread decree,
 Nor hope in this uncertain state
 To find a seat secure from thee.” ALÍ BIN MUHAMMAD.

The attendants at the Shrine still show several pieces of this Arák tree, which are kept carefully wrapped up in a piece of cloth.

The disciples say that Mi'áh Ráná, and Khán Dhodá did not perish here; and that after the death of Sukhí Sarwar they set out for Bághdád. The book from which I have taken the preceding legend, however, is silent as regards Khán Dhodá; but it is stated therein that Mi'áh Ráná, and his mother—Bíbí Bá'ie—after the martyrdom of the Saint, prayed unto the Almighty to deliver them from the hands of these Philistines; and that the earth having opened almost immediately, they for ever disappeared from mortal ken.

The grave of Núr and Issák is on a neighbouring and more lofty hill, about five hundred paces to the west of the Shrine. It consists of a platform about eleven yards long by eight broad, and four yards high. On the top of this is a smaller platform on which are two tombs. The grave of Omar and Alí is situated a little to the north of the sepulchre of Núr and Issák, and is marked merely by a mound of stones or cairn, erected where they fell.

“If I must fall in the field, raise high my grave, Vinvela. Grey stones and heaped-up earth, shall mark me to future times. When the hunter shall sit by the mound, and produce his food at noon, ‘Some warrior rests here,’ he will say; and my fame shall live in his praise.” OBBIAN.

Again to return to the book. “For some years the fact of the death of Sakhí Sarwar remained unknown, and at length had almost been forgotten; for the Mussalmans of those parts had been exterminated. At length one Malik Esau, a merchant, who was proceeding from Hindústán to Bághdád, chanced to halt for the night at the place where the town now stands, for it lies in the direct road to Kándáhar and Persia. His servants were busily employed preparing the evening meal, when what do they see but the vessels filled with blood! Dismayed at this, they ran and acquainted their master with the circumstance. He too, astonished at what had happened, stated that the place they were then standing on must have been the scene of martyrdom, or was the burial-place of some holy person; and he therefore directed them to prepare the victuals at a greater distance off.

“At midnight, when it was time to load the baggage animals and proceed on their journey, the large camel which carried the merchant

suddenly became quite lame, and consequently he was under the necessity of sending on his fellow-travellers, and his own people, with the baggage, to the next stage; whilst himself and son remained behind intending to await the morning's dawn, in hopes that the camel might be able to follow. When morning drew nigh, three horsemen made their appearance coming towards them from the hills, one of whom having advanced before the others cried out:—‘Oh Malik Esau! why art thou sitting thus sorrowful and distressed?’ The merchant answered:—‘How can I be otherwise when my companions have proceeded on their journey, and I am left alone here in this desert with my son—my camel lame, its load on the ground, and no other animal to supply its place?’ The horseman who was no other than the Sarwar himself, said:—‘Fear not, for by the time the day dawns your camel will be well again. Load him and set off on thy desired journey; and when thou shalt have reached Bághdád, make known unto all people that in Hind, at a place sixty miles west of the city of Múltán, on the skirt of the hills, there is a place of martyrdom; and whosoever falleth into calamity and goeth there, shall, by the will of God, escape from it.’

“Malik Esau on arriving at Bághdád related the wonderful accident which had befallen him on the journey, and as directed by the apparition, but no one would believe him; so Esau to convince them of the truth of his statement killed the camel, and from the leg which had been affected with lameness on that occasion, he took out several iron nails. The most incredulous were now convinced; and shortly afterwards two sick persons with their families set out on a pilgrimage to the grave of Súltán Sakhi Sarwar. One named Kholer was blind, and the other called Langá was afflicted with the leprosy; but on their arrival at the scene of the martyrdom of the Saint, they were by a miracle restored to perfect health, and confidently believed that he would appear unto them. They were not disappointed; for they had not been dwelling there very long before three horsemen came out of the hills one day and made towards them. They comforted them greatly, and bade them reside there altogether and take care of the remains of the Saint, promising at the same time protection from all ills. The horsemen stayed with them and said the *æasar* or meridian prayer, after which they disappeared as they had come.

"The next person who came and took up his residence at this place was one named Shaik who was impotent; and he too recovered and became an attendant at the tomb. The present attendants are descended from these three persons already mentioned, and constitute three different families—Khoker, Langá, and Shaik. The former are considered the principal, and are the most numerous: the Langás are the next in rank. In the course of time one Ahmed Khán, an Afghán, took up his abode here; and having attained the object of his wishes, he became a permanent resident, and a follower of the Saint. By the assistance of Ahmed Khán, for he was a wealthy man, they built the tomb over the ashes of Súltán Sakhi Sarwar, and from that time to this, people from all parts, both Hindú and Muhammadan, have sought it as a place of pilgrimage; and he whose heart is pure and clean, by coming here attaineth the object of his wishes."

Such is the legend of Súltán Sakhi Sarwar, whose odour of sanctity is so great as to draw crowds of people—Hindu and Muhammadan, Sikh and Belúch—yearly to his Shrine from all the surrounding countries.

The greater number of pilgrims who seek the Shrine are young women with old husbands, and those who may not have been blessed with children; many sick persons also come in hopes of being restored to health; and others to obtain increase of worldly goods. These make a small offering in money and vow to give a larger sum at the ensuing *Melá* if their wishes shall have been fulfilled. Sick people too, who may be unable to attend in person, make their vows by proxy, to present a certain oblation the next year should they recover their health.

It is related that a certain man, one of whose eyes had been affected with a disease for a long time, made a vow that if he should recover the use of the organ, he would present an eye of gold at the Shrine of the Saint. He recovered the use of it, and caused the golden eye to be made, as he had vowed he would do, with the intention of placing it on the Shrine in person. It was near the time of the *Melá*; and it so happened that one of the attendants, who was blind of an eye, being out as usual collecting contributions and donations in the name of the Saint, heard of the matter of

the golden eye, and the man's determination to present it in person. He therefore went and endeavoured to persuade him against undertaking so long a journey, saying that there was no necessity whatever for so doing, for he would himself present the oblation, and thus save him the trouble of going in person. He also urged as a reason, that the sooner the offering was made, the greater would be the merit, and therefore no time should be lost. A wag who was present, on hearing this, asked the disciple, whether the Saint really had the power of restoring sight to the blind. He answered that he had the power of granting every thing, and of fulfilling all desires. "If such be the case, says the wag, how is it that you are blind of an eye? He should at least have restored your sight, who are a servant of his threshold!" The attendant replied. "Do you not know, Oh, sinful man! that whatever the Saint grants to his votaries he takes from his *Majúwiran*,* and gives the latter something else in exchange? At the time of my birth he took the sight of my eye, and preserved it for the use of his votary, and determined that the eye of gold should be mine; therefore this man who has received my living or human eye, should give me the eye of gold, in order that thus right may obtain right."

The most respectable and enlightened Muhammadans of the district, such as Mullas and others, say that Sakhi Sarwar himself was doubtless a very pious and holy man, as is proved by the mention made respecting him in several books under the name of Suyed Ahmed; but they consider this *Melá* and its consequences in direct opposition to the rules and tenets of the true Orthodox Faith; and probably it would be so considered, even by the Suyed himself, in whose honor, and in whose name it is held.

The more southern districts of the Panjáb are remarkable for the number of *Melás* or Fairs. In the Múltán district alone there cannot be less than some scores in the course of a year.

Múltán, June 6th, 1855.

* *مجاور Majáwir*.—an attendant at a mosque, and devoutly employed or attached to it.

On the age of the Coal strata in Western Bengal and Central India.—By Rev. STEPHEN HISLOP, Nagpur.

The age of the coal field of Newcastle, Australia, has been a subject of discussion to as great an extent almost as the geological position of our Indian carbonaceous strata. For my own part, I have been inclined to acquiesce in the view of McCoy, who, in the *An. and Mag. of Nat. Hist.* vol. XX., endeavours to prove that the beds with vegetable and those with animal remains belong to different formations,—that the former are Oolitic, while the latter must be referred to Palæozoic times. Not having his paper at présent in my possession, I cannot now adduce the arguments by which he seeks to establish his opinion; but it is of little consequence, as the evidence, which I shall bring forward, in the sequel, on the age of our Indian coal measures, will be independent of the Palæozoic or Mesozoic character of those of N. S. Wales.

Perhaps the most interesting part, in a section of the rocks of Central India, is the junction of the massive sandstone above with the laminated strata below. The latter, however various they may be in different localities as regards their lithologic and sometimes even their palæontologic features, may readily enough be distinguished by their relation to the superior beds, whose identity again is sufficiently attested by the iron bands, which run through their mass. This ferruginous sandstone is well developed at the Mahádeva Hills, in the north of the province of Nagpur, in the vicinity of the city itself, and at Kotá on the Pranhítá, in the dominions of the Nizam. The subjoined sections represent the succession of the strata at these places respectively, as far as they are known :

1.—Mahádeva Hills.		2.—Near Nagpore City.		3.—At Kotá.	
85 feet.	2,000 feet	75 feet.	50 to 100 ft.	80 feet.	50 to 500 ft.
	Massive sandstone with iron bands.		Massive sandstone with iron bands.		Massive sandstone with iron bands.
	15 ft.		15 ft.		9 ft.
	Carbonaceous and other shales with ferns, vertebraria, phyllothea, &c.		Laminated argillaceous sandstone with ferns, vertebraria, phyllothea, &c.		Argillaceous limestone.
	25 ft.		Sandstone.		4 ft.
45 ft.	Green shale.	30 ft.	Green shale.	11 ft.	8 ft.
			Red shale.		Bituminous shales with argillaceous limestone.
			Crystalline limestone.		Limestone.
		40 ft.		27 ft.	25 ft.
				23 ft.	Clays with limestone.
					Red shale.
					Limestone.

In the preceding sections the dimensions depend partly on inference with the exception of those of No. 3, which were ascertained exactly by the measurement of the late Dr. T. L. Bell. They are, however, I believe, sufficiently accurate for the purpose for which they are given. That purpose is to exhibit the similarity, which exists among all these sections. Immediately under the upper sandstone, laminated rocks are seen in all. In section 1st, the shales are bituminous and carbonaceous, while in section 2nd, they are of argillaceous sand. But that they are of the same age, there can be no doubt, as many species of fossils are common to both. In comparing sections 1st and 3rd, we find that the latter instead of having the limestone all collected in the lower part of the section, as is the case at Nagpur and in many parts of the Nizam's country, has it interstratified with the shale; but leaving this peculiarity out of view, we perceive that in it the bituminous strata occupy the same position as in section 1st. The difference in organic remains between these two sections is more than counterbalanced by their agreement in the sequence of the inferior rocks, which (still omitting the interstratified argillaceous limestone from section 3rd, and choosing section 2nd as being better known for comparison with it, instead of section 1st) gives us in descending order sandstone and clay, red shale and limestone.

Now, if the fern-bearing coal shales and laminated sandstones of this province be the same as the fish-producing bituminous shales of Kotá, then the light, which the last mentioned beds afford regarding their own age, may be cast back on the other two. It is satisfactory to find, that the evidence supplied by the Kotá fossils is that of animal remains. The fishes that rewarded the researches of Drs. Walker and Bell have been pronounced by Sir P. Egerton to be true Oolitic forms, and probably of the age of the Lias; and therefore our vegetable organisms can be no older. To make this part of the evidence complete, and with the view of introducing some remarks on the testimony of our fossil plants, I may here mention, that between Nágpur and Chándá, at both of which places the upper sandstone has the usual iron bands, and the bare laminated beds the common vegetable remains, there is a district with Mángali as the centre (sixty miles S. of Nágpur) where the superior sandstone is less ferruginous, and the inferior or laminated beds are coloured by iron of a deep brick red. In the latter strata, where, from the analogy of the country both South and North of them, we should expect an abundance of ferns and stems, the remains of reptiles, fishes and entomostraca predominate, while the few vegetables that are found, are generally very different from those occurring in other parts of this territory. And yet from the position of this sandstone I have very little doubt that it is the same as that of the more ordinary appearance. The teachings of its Fauna are interesting. The skull of a Labyrinthodont, named by Owen *Brachyops laticeps*, might suggest for it a Triassic or even Carboniferous age, but the plentifulness of scales of lepidotoid fishes forbids us to assign a more ancient epoch than the Jurassic; and the conclusion is unavoidable, not that our laminated sandstone is older than the age we have attributed to it, but that the Labyrinthodont family has come down to a more recent period than is generally believed.

But now it is time to inquire what we are to learn from our fossil *plants*, regarding the age of the carbonaceous shales and laminated sandstone of this province.

The testimony of vegetable remains I do not reckon of trifling value. When they belong to a large genus like *Pecopteris*, which

has run through many successive changes of the earth's surface, than the information they supply is not very precise. But the very same may be said with greater force of the genus *Terebratula* in the Fossil Fauna. And I have observed that, even among plants of an undecided character as regards genus, there is generally some form, which distinguishes the species of one epoch from those of another. Besides, a geological age may be known from the abundance of a genus or family of plants at one period as compared with others. Though the discovery of a single species might not decide the question, yet if the genus, to which it belongs, culminates in a certain formation, and a particular stratum presents an unusually large proportion of that genus, then some idea may be formed of the age of that stratum. Such is the case with the entire fronded ferns. They reached their maximum development in the Jurassic period, as the Oolite of Scarborough, Stonesfield, and, according to H. Miller's recent researches, of the North of Scotland, plainly shows; and one of them, the genus *Tæniopteris*, which is so fitly associated in our carbonaceous strata with *Glossopteris* and *Cyclopteris*, is almost confined to the Oolite, there never having been an example of it hitherto met with in the true coal measures.

Having said thus much on the general principle, I proceed to apply it to special instances. There are three localities with which our strata admit of comparison—Stonesfield and Scarborough in England, and Richmond in Virginia U. S. The slate at the former British locality and the carbonaceous shales and sandstones at the latter, are universally acknowledged, I believe, to be Lower Oolitic; while the American coal formation referred to, is generally assigned to the same era. Now the connexion between our strata and the Stonesfield slate seems to be, the abundance of *Tæniopteris*, and a resemblance among the fruits or seeds. The similarity to Scarborough consists in the presence of what Lindley and Hutton call *Equisetum laterale* with its deciduous discs at the joints of the stem, a plant, which to the best of my knowledge has hitherto been discovered nowhere else. The relation to Richmond is more intimate still, *Tæniopteris magnifolia*, found there by Prof. W. B. Rogers, appears to be specifically identical with one of the same genus here; and the descriptions given of the Virginian *Calamites*

erroneously so-called, correspond exactly with the *Phyllotheas* of Central India. And if we are to count the strata of Mángali among the representatives of our carbonaceous shales, then they furnish other two points of comparison with the Richmond coal basin, viz. in a *Knorria*, and another stem, resembling a *Lepidodendron*, but which may be called an *aphyllum* or perhaps *Aspidiaria*. I might here add a third link of connexion between those Mángali and Richmond beds, viz. the occurrence of two forms of *Entomotraca* belonging to the genus *Estheria*. But in this instance, the evidence of the Fossil Fauna is not so distinct as that of the ancient Flora. The inference to be drawn from a particular species of *Teniopteris* being common to the rocks of Eastern Virginia and Central India is, in my opinion, conclusive as to their contemporaneousness; but not so that drawn from the discovery of *Estheria* in both, as the genus just named, after having been too frequently taken for a mollusc, is now recognised in the carboniferous formation, and, I believe, the old red sandstone, as well as in the Lias, the Oolite, and the Wealden. Judging from Sir C. Lyell's figure, there is a great agreement between his species and ours, but when Rupert Jones, one of our best authorities in this department, is able to pronounce upon them, his decision will set the matter at rest.

I suspect that a good many other instances of resemblance between our fossil plants and those of admitted jurassic strata might be pointed out; but materials as yet are deficient. There is still wanting a revision of our ancient flora, discriminating between true Carboniferous and Oolitic types. For example, how long have all furrowed stems in Europe and America, and I need not add India, also, been referred to *Calamites* and more rarely *Equisetum*, whereas many of them, viz. those characterized by the absence of tubercles, and the opposite arrangement of their sulci, must undoubtedly be classed under the genus *Phyllothea*. To establish some such clear distinction as this, is a step towards the determination of the age of the rocks, in which those stems are respectively met with; while an alternate furrowed tuberculated stem is never found in the Oolite, on the other hand, the stems destitute of tubercles and with opposite sulcation almost exclusively occur in that formation.

Hitherto my remarks have been confined to the carbonaceous strata and laminated sandstone of Central India. In now including the coal measures of Bengal in my comparison, I must bespeak indulgence, as I have personally examined none of the strata or fossils of that part of India, and must depend wholly on the descriptions and a few figures that have already been published.

By "coal measures of Bengal" of course I do not understand those on the N. or N. E. of Calcutta, some of which doubtless belong to a Tertiary age; but I mean those on the W. and N. W. of the Indian Metropolis, of which the strata in the Dámúdá basin may serve as a specimen.

These strata, I consider to be the same as what we have in the north of this province, and therefore, if my previous reasoning has been sound, they also are to be regarded as jurassic. The grounds of my identification are 1st, similarity in organic remains, and 2nd in geological position.

1. *Similarity of organic remains.*—In the bituminous shales of the Mahádeva we have the following Bengal fossil plants: *Tryzgia speciosa*, *Vertebraria indica*, and a species of *Phyllothea*, a fragment of which is figured by Dr. McClelland as *Poacites minor*. Geol. Journ. Tab. XVI. f. 4. In the carbonaceous shales of Umret, beside the *Phyllothea* now alluded to, another stem, but unfurrowed which seems to resemble McClelland's *Poacites muricata*. Tab. XIV. f. 6. In the laminated sandstone of Kámpti, in addition to *Vertebraria* and the two *Poacites* as above, *Teniopteris*, perhaps of the same species as at Rájmahal, and McClelland's *Pecopteris affinis*. Tab. XIII. f. 11 b., which in our specimen, is seen to be a well marked species with a tripinnate frond.

In all these localities, the genus *Gloscopteris* abounds, but it is difficult to represent in a figure its minutely anastomosing venation, that nothing but a comparison of specimens side by side would warrant the identification of species. However, there is little fear of any of the Bengal ones failing to find a match among some of ours, as from the sandstone and coal shale, we must have about twelve species in all, many of them very perfect and in the height of fructification. While we seem to have outstripped Northern Eastern India in *Cyclopteris* and several other vegetable remain

we are decidedly behind in regard to the Cycadeaceæ. The only specimen, which I have procured is a small fragment from the sandstone of Kámpti, the leaflets of which are narrower than the minutest blade of grass, that I have ever seen.

2nd. *Similarity of geological position.*—It may be supposed that, though there is a general agreement in fossils between the coal strata of Bengal and oolitic rocks here, yet their position may be slightly different. However, from all the descriptions of Bengal coal strata, to which I have had access, I have noticed that where the sandstone is present to afford materials for comparison, the tendency to bituminous and carbonaceous shales there, as here, occurs immediately under the great mass of arenaceous beds. In proof of this I need only refer to the sections given by Mr. Homfrey from* Palamow and Singrá, and to the observations made by Mr. Osborne on the supposed coal-field at Umláh ghât near Bidjeegurh.†

In conclusion I would add, that though among the Cutch oolitic strata some are evidently marine, yet from what I have seen of those in the Deccan or read of those in Bengal, I know of none of them, in either of these districts that exhibit the least evidence of having been deposited in the sea or ocean: all seem to be of fresh-water origin.

* Beng. As. Soc. Journ. Vol. XI. p. 738. † Ibid. Vol. VII. p. 843.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR MAY, 1855.

At a meeting held on the 2nd instant at the usual hour,
SIR JAMES W. COLVILLE, KT. President, in the chair.

The minutes of the last month's proceedings were read and, after some modification, confirmed.

Presentations were received—

1. From the Right Rev. the Bishop of Victoria, forwarding through the Rev. Mr. Cuthbert, a copy of the Gospels of Luke and John, the Acts of the Apostles, and the Epistle to the Romans, in the Loochooan language, and promising soon to send St. Luke's Gospel in Japanese.

2. From J. Watson, Esq. B. C. S., two more specimens of fossil wood and leaf impressions of a species of *Cycas* from Rajmahal.

With reference to the specimens, Mr. Pontet of Bhagulpore states that "The Fossils are to be had at Bindrabun, a small hill south east of Terriagully—six miles; but any body wishing to find them, ought to go to the dâk stage called Shahabad and then down my road half a mile and turn to the left."

3. From Capt. Saxton, Pooree, announcing despatch of further specimens of coal from Gangpure and of iron stone from Gurjang in the Autmallie Rajah's territory.

Capt. Saxton writes as follows:—"I have to advise you of the despatch, by cart to the Calcutta Exchange, of a further supply of the "Gangpur" coal. I have also sent some iron stone, which I met with in a village (Gurjang) in the Autmallik Rajah's territory, and which, from what I learnt from the people employed in manufacturing the iron, is of a more valuable description, than what is usually found in such abundance in many parts of the Tributary Mehals of the Cuttack and S. W. Frontier Agencies. The villagers, speaking from conjecture,

say, they obtain a *fourth* of iron from this stone. This conjecture may be far out, but they seemed aware that this one was richer than that obtainable in other parts. The process of manufacture was also somewhat different. The stone goes through a preliminary process of roasting with wood fuel, and is then beaten into a *powder* for smelting with charcoal (made from saul wood) fuel in the usual manner. No flux is ever used, though lime is very abundant, all over these districts. Merchants from Cuttack and Ganjam purchase all the iron made, payment being given by advances in grain, at a rate very unfair for the manufacturer. I have sent specimens of the ore and iron in their several stages. The ore is procured in any quantity by digging immediately below the surface.

"I have also enclosed two other curious specimens. The soft red stone was strewed over a part of the large valley west of the Gangpur coal bed. I had occasion to erect a stone mound, and only that description of stone was at hand, and my mound now stands made of similar stones all streaked inside like these specimens, the streak taking different forms, corresponding more or less with the shape of the stones "

4. From the Government of the North Western Provinces through W. Mayne, Esq. Offg. Collector of Banda, eleven copper Sunnads of maffee villages in Zillah Banda.

5. From Dr. Falconer, a full and descriptive Catalogue of the Tertiary Fossils in the Society's Museum, classified, so far as the specimens admit of identification, according to the localities in which they were found and showing the names of donors.

6. From William Cobb Hurrey, Esq. specimens of pottery found in Sunderbund Grant No. — by Mr. Thierry, seven feet below the surface of the ground, while digging earth to make bricks.

His Highness Mohammad Hossain Ally Ex-Ameer of Scinde, duly proposed and seconded at the last meeting, was elected an ordinary member.

The following gentlemen were named for ballot at the next meeting.

T. Thomson, Esq. M.D. proposed by Mr. Grote and seconded by the President.

J. W. Sherer, Esq. C. S. proposed by Mr. Allen and seconded by Mr. Grote.

Dr. Montgomerie, proposed (for re-election) by Lt. Lees and seconded by Dr. Boycott.

The Council submitted reports—

1. Recommending that the offer of Dr. Sprenger to edit a Geographical Treatise of the 4th Century of the Hijerah be accepted.

2. Recommending that the following offers also be accepted, viz. that of Mr. Hall, to edit the *Kāvaya Darsa* of Dandi with the same author's *Das'a Rupaka*, that of Lt. Lees, to edit the *Nakhbatul Fikr*, and that of Mr. Hall, to bring out, in conjunction with Pundit Ramnarain, the text of the *Vishṇu Purāṇa*.

Regard, however, being had to the existing liabilities of the Oriental Fund, they recommended that the printing of these works be postponed till next year.

3. Submitting for the favorable consideration of the meeting, a report from the Natural History Committee, recommending the disbursement of Rs. 1500, on cases for the newly arranged Department of Tertiary Fossils, and suggesting that the Society should solicit the aid of Government for paving with Chunar stones the whole of the ground-floor of the Museum.

The following is the report of the Committee:—

“In submitting to the Council an application for a grant of money to ensure the preservation of the instructive and valuable series of fossils lately arranged by Dr. Falconer, the Committee of Natural History would suggest to the Council that the present offers a favorable opportunity for soliciting the aid of Government towards the carrying out of several measures essential to the conservation of the many valuable collections, now forming the museum.

“The principle of occasional grants to the Society for special purposes, is distinctly recognized in the following paragraph of a letter from the Honorable Court of Directors, dated 18th September, 1839.

“‘The independent and useful activity of the Asiatic Society of Bengal during so long a period, entitles it justly to your consideration, and looking to it as the only institution in India, which offers any analogy to the great national libraries and museums of Europe, it is a legitimate object of public support. We therefore, approve of the aid and encouragement which you have given. We think, however, that the extent to which you have gone is fully adequate to all purposes of public utility. The Society is already in possession of a library and museum of some extent, and the additions that may be

made to either must be occasional and progressive. It does not happen in India as in Europe, that large public or private collections of a rare and valuable description are offered for sale, and all accessions which the Society will have an opportunity of acquiring must be of limited extent and incidental occurrence. From the character too of the persons who are likely to contribute to the Society's collections, it is very improbable that a pecuniary equivalent will in all cases be desired, and it seems to us, on various grounds unnecessary and objectionable to assign to the Society a permanent grant for the purpose of effecting occasional purchases. When an application from the Society comes before you for any definite outlay, it will be time enough to take into consideration the expediency of granting the particular assistance that may then be required. We shall not object to your granting to the Society funds for special purchases as occasions arise, as far as may be compatible with a due regard to public economy. On all such occasions you will forward to our Museum a selection from the articles which may have been so procured.'

"Your Committee deem that one of the most important requirements of the Museum is a pavement of Chunar stone in the basement story. The necessity for such a pavement arises from the Museum being thrown open to the public, who frequent it in considerable numbers, constantly wearing the floor and unavoidably giving rise to clouds of dust which materially injure the specimens.

"It is in the freedom of access that the Society offers an analogy to the national museums of Europe, and by throwing open to the public the rich stores of Natural History, collected from all parts of Asia, contributes to the growth and spread of science and education among the natives and residents of India. On these grounds the Committee consider themselves warranted in soliciting the assistance of Government, the remedying of the great evil now complained of by the substitution of Chunar stone pavement for the present very inefficient one of lime and bricks.

"The Committee submit an estimate amounting to Co.'s Rs. 1500 for eight glazed cases which they consider absolutely necessary for the preservation of the fossil remains, in the order in which they have been arranged by Dr. Falconer; an order which, if once destroyed, it is doubtful if any man in India could restore, they therefore urge

upon the Council to sanction this expense great as it appears, that the labours and scientific knowledge devoted to this arrangement, be not lost.

“As connected with it, they would recommend the printing of the catalogue of these fossils ;—a most masterly and erudite description of all the specimens, the publication of which will reflect no less credit upon the Society than upon its author Dr. Falconer.”

W. E. BAKER,
M. BOYCOTT,
G. G. SPILSBURY,
A. C. MACRAE,
A. GROTE.

The recommendations were adopted.

The Council also submitted a recommendation to the effect that the thanks of the Society be offered to the following gentlemen for the Meteorological information which, in compliance with a request made by M. Leverrier of the Paris Observatory and circulated by the Council, they have furnished to the Secretary for transmission to Paris :—

Sir R. C. Hamilton, Bart., Indore. Sir H. Lawrence, K. C. B. at Mount Aboo. Major Hollings, Shahpore. Mr. Edgeworth, Jullundur. Mr. Purdon, Dilur. Mr. C. Gubbins, Allighur. Dr. Fayrer, Lucnow. Major G. Ramsay, Nepal. Major H. B. Edwards, Peshawur. Capt. Elliott, Nagpore. Major Phayre, Rangoon. Capt. Hopkinson, Akyab. Lt.-Col. Jenkins, Gowhatty. Dr. Duka, Comillah. Dr. Withecombe, Darjiling. Babu Rádhánáth Sikdar, Calcutta.

The Council further reported that they have allowed to the Librarian a commission of 10 per cent. on the proceeds of books sold from the Library.

The several recommendations having been put to the meeting *seriatim* were carried.

In compliance with the notices given at the last meeting, Mr. Houstoun asked to have laid before the meeting all notes or comments relating to the introduction or cancelment of any introduction to No. 80 of the Bibliotheca Indica.

The President stated that there were objections to the production of these papers and declined to produce them. He further stated that no passage in the introduction in question had been cancelled.

Mr. Houstoun next proposed that the Society request Mr. H. V. Bayley to accept the Joint Secretaryship of the Asiatic Society, but on the President pointing out that there being no vacancy in the Council such a procedure would be against the rules of the Society, he withdrew the motion.

Mr. Houstoun then wanted to know what communications are, as a matter of course and in what stage, to be laid before the Society, and for what communications the Society must depend upon the Council?

The President, in reply, referred him to Bye-laws 64, 77, 78 and 79.

Mr. Houstoun also wished to know by whose advice and authority the niche has been made in the Society's meeting-room to the obstruction of a proper circulation of air.

The Secretary stated that the niche had been built and the cast of Sir P. Cautley's bust placed there with the sanction of the Council.

Communications were received—

1. From E. Blyth, Esq. submitting a report on a zoological collection from the Somáli country.

2. From Capt. Tickell, the description of a new species of *Buceros* from Tenasserim.

3. From B. H. Hodgson, Esq. Comparative Vocabulary of the languages of the broken tribes of Nepal.

The Secretary exhibited to the meeting MS. of a Limboo work supposed to be the only work extant in that character, belonging to Capt. Mainwaring and kindly left by that gentleman for exhibition.

The Librarian and Curator of the Zoological Department submitted their usual monthly reports.

Report for May Meeting, 1855.

Our gatherings for the last month consist of

1. The collection from the Somáli country made by Lt. Spöke, of the 46th N. I., and forwarded to the Society by Lt. Burton, in command of the expedition into that region. Upon this I have elsewhere reported.

2. We have received two packages of bird-skins, from Lt. Alex. J. Trotter, of the Bengal Artillery, Pesháwur. The most remarkable specimens are the European Rook (*CORVUS FRUGILEGUS*), which was previously observed in Afghanistan by Capt. Hutton,—the *PASSER SALICICOLUS* (Vieillot, v. *hispaniolensis*, Tem.), also obtained in Afghanistan by Capt. Hutton,—and *EMBERIZA ESCALONICA*, Brisson (v. *E. pithyornis*,

Pallas, and *E. albida*, nobis), previously obtained by Capt. Hutton in the Tyne range between Masuri and Simla. The European Jackdaw (*Corvus MONEDULA*), as well as the Rook, occurs at Pesháwur; and the former of these is very common in Kashmir.*

3. Babu Rajendra Mallika. A dead Monkey, *MACACUS CYNOMOLGOS*.

4. J. Uvedale, Esq. A small snake, which fell down from a cocoa-nut tree in the neighbourhood. The species appears to be undescribed, and may rank as

DIPSAS HEXAGONOTUS, nobis. Specimen evidently quite young; but well distinguished from the common *D. TRIGONATA* by a series of broad hexagonal scales, commencing at the occiput and continued along the whole back. The lateral scales (towards the abdominal plates) are distinctly grooved. Head as in *D. TRIGONATA* and various affined species. Colour of specimen bright ruddy-ferruginous, inclining to coral-red; paler below, and mottled with black bordering some of the scales of the upper-parts. Head green, the throat white, and the labial plates posterior to the eye yellow: a slight blackish occipital streak. Scutæ 247: scutellæ 126 pairs. Rows of scales 21. Length of specimen 18 in., of which tail 4 in. It probably grows to a large size, and may become wholly green.

We take this opportunity to remark, that we are at present in temporary possession of a fine living specimen of the *GRUS AUSTRALASIANA*, Gould (or 'Native Companion' of the Australian colonists); which, until recently, was supposed to be identical with *GR. ANTIGONE*, (L.), or the Indian *Sáras* or *Surhuns*. Mr. Gould's figure of it, in the 'Birds of Australia,' is far from being one of his best. The Australian Crane has much more of the aspect of *GR. VULGARIS*, Pallas; but is considerably larger, with the head bare and papillose to just below the conspicuous patch of grey ear-coverts, and a dewlap-like throat-wattle or pendulous lappet of skin (of a black colour with red or carneous anterior edge), which is

* In a letter dated April 22nd, Lt. Trotter remarks—"I observe that those flights of *PASSER SALICICOLUS* have begun again this month; and I am afraid that their appearance is a sign of the approaching hot weather. They fly in large flocks towards sunset, in every direction, and turn about all at one time." Again, after a visit to Kohat, he writes—"I saw immense flocks of *PASSER SALICICOLUS* at Kohat, where it is called the 'Kabul Sparrow.' They roost in thousands on the trees there, and we fired once or twice at them, and knocked over upwards of 50 at one shot. I even heard that 117 had been brought down at a single shot." Lt. H. M. Drummond, of H. M. 42nd Regt., notices the highly gregarious character of this species in Barbary, where it is the common House Sparrow of the country. *Vide Ann. Mag. N. H.* XVI, 107.

peculiar and characteristic. In GR. ANTIGONE, the red papillose skin of the neck extends down about 4 in. below the grey ear-coverts, which form a smaller patch than in the Australian bird. Both species have the crown slaty, and bright orange-yellow irides; but as seen from a little distance, the Australian shews conspicuously a crimson occiput with contrasting black throat-wattle, the cheeks being of a paler red; while the Indian exhibits a much greater extent of crimson on the neck and throat, with some black bristle-like plumes on the throat, occiput, and upper part of the neck, more or less developed in different individuals. The legs of the Australian species are shorter than in GR. ANTIGONE; being of the same proportions and of the same dusky slate-colour as in GR. VULGARIS; whereas those of GR. ANTIGONE are crimson-roseate. The tarsi, in GR. ANTIGONE, measure 12 to 12½ in.; in our specimen of GR. AUSTRALASIANA, but 10½ in. The latter has the plumage uniformly ash-grey, with the lengthened tertiaries neither curled as in GR. VULGARIS, nor albescent as in GR. ANTIGONE. In the *vivarium* of Babu Rajendra Mallika, where are, at the present time, several dozens of GR. ANTIGONE, and also of GR. VULGARIS and of GR. VIRGO; and we remark that about the month of April all of the first species (or *Sáras*) assume a broad pure white collar immediately below the crimson papillose skin of the neck: they then illustrate the *Gr. torquata*, (Latham), Vieillot, which accordingly is merely GR. ANTIGONE in its nuptial plumage. We have known instances of the *Sáras* breeding in captivity, when a pair is allowed the range of a large walled garden (protected from Jackals), containing shallow inundated enclosures for the growth of rice: in these the nest is commenced under water, and raised for some inches above the surface; and the eggs are two in number, about 3½ in. long by 2½ in. broad, of a bluish-white with a few distantly placed rufous specks and blotches. The young follow their parents from the first (unlike those of the ARDEADÆ), and have the head and neck *clad with feathers* of a dull light ferruginous colour, which begin to fall when the bird is more than half-grown. Besides the three Indian species of Crane here mentioned (of which the *Sáras* alone is known to breed in the country), a fourth occurs as a great rarity in the N. W., the GR. LEUCOGEBANOS, Pallas (white, with black primaries, bald face, and pinkish-red legs). This fine species was procured by Burnes in Afghánistán; and we have been assured that it has been occasionally observed in Rájastán. Schlegel even gives Bengal as a habitat (which we cannot but think requires confirmation, even though skins may have been received *viâ* Bengal)! A fifth Asiatic Crane exists in GR. MONTAGNESIA, (C. L. Bonap.), from Mantchuria; a sixth in GR. VIPIO, Pallas, which chiefly inhabits the extreme east, as the Corea, Japan, &c.; and there is

even another in Japan (besides also *GR. VULGARIS*),—the *GR. MONACHA* of Temminck.*

We may also here notice, that we have received from Robt. F. Tomes, Esq., of Welford (near Stratford-on-Avon), a large number of most carefully taken descriptions of the specimens of Indian Bats and Shrews in the British Museum and that of the Hon'ble E. I. Company in London; the actual specimens upon which Dr. Horsfield and Dr. J. E. Gray have founded and named sundry species. As regards the Shrews, Mr. Tomes has *independently* arrived at several conclusions identical with those expressed in the Memoir on the Indian species of Shrew, published *ante*, p. 24 *et seq.*: and, with reference to the *CROSSOPUS HIMALAYICUS*, Gray (p. 37 *ante*), he writes—"The specimen has the same dentition as *SOREX CÆRULESCENS*; but the teeth appear to me to have been pushed into the mouth from the outside, and no doubt belong to some other animal,—the skull having been removed, and these teeth introduced to conceal it [!] It is a good species; and, I think, has the tail ciliated, but having been slit up along the under-part by the skinner, it is difficult to determine." He also remarks that "*SOREX CAUDATUS*, Hodgson, is certainly very closely allied to *S. ALPINUS* of Europe, if not-identical with it" (*vide* also p. 37 *ante*). Our *SORICULUS* (p. 36) is probably identical with *BLARIA*, Gray. Mr. Tomes believes *S. CÆRULESCENS* and *S. indicus* to be "of one species. *S. MURINUS*," he adds, "is also very nearly allied, but has the fur much longer and of a much browner colour, and it looks coarser. *S. GRIFFITHII*" (apparently *murinus* apud nos, not the Malayan *MURINUS*), "is evidently distinct, having a totally different kind of fur, larger teeth, and different dimensions. *S. NIGER* of Elliot is a miniature of *V. GRIFFITHII*, but with a long and slender tail. All of these are of the same type as *S. CÆRULESCENS*."†

* For a Conspectus of the species of Crane, *vide* the Prince of Canino in the *Comptes Rendus*, XL, 720 (April 2nd, 1855).

† The following is a new species of typical *SOREX*, recently received from Capt. Berdmore, of Schwe Gyon, Pegu.

S. FULIGINOSUS, nobis. Length of adult female (taken out of spirit) $5\frac{1}{2}$ in., of which tail $2\frac{1}{2}$ in.: foot *plus* $\frac{1}{8}$ in. Skull exactly 1 in. long, and $\frac{1}{8}$ in. in greatest diameter: length of series of upper teeth $\frac{1}{8}$; and breadth of palate $\frac{1}{8}$ in. Soles bare to the heel. Tail with seventeen vertebræ, and perhaps a minute eighteenth at tip; the scattered long hairs upon the tail small and fine. Fur dense, porrect, somewhat velvety; dark slaty at base, the rest fuliginous-brown, with inconspicuous dull hoary tips: beneath scarcely (if at all) paler. A second specimen merely differs in having a trifle smaller.

As Mr. Tomes will probably edit a reprint of the Memoir referred to, it is unnecessary to go further into detail here with the Shrews; and with regard to the Bats, as we hope to prepare a similar Memoir on the Indian species of this ordinal group, it will suffice, in the present instance, to note a few identifications of some interest.

Mr. Tomes remarks, that—"Specimens of *PLECOTUS*, and of *BAEBASTELLUS*, from Nepal, forwarded by Mr. Hodgson to the museum of the Hon'ble E. I. Company, are perfectly identical with examples of the same genera from my own collection, taken here [in England], and which are now placed by the side of the Indian specimens in Dr. Horsfield's case." (*Vide* also *J. A. S.* XXI, 360). We have also minutely and carefully compared European and Masuri specimens of *SCOTOPHILUS SEROTINUS* and *Sc. LEISLERI* (v. *dasycarpus*), and can detect no difference whatever; the latter species varying in shade of colour. *Vesp. labiata*, Hodgson, does not appear to have been, as yet, properly compared with the European *NOCTULINIA ALTIVOLANS*; in other words, sufficiently good specimens of each have not hitherto been compared together: but there seems to be little doubt of their identity. *MYOTIS MURINUS* of Masuri accords minutely with the descriptions of the European species. and perhaps *V. PALLIDIVENTRIS*, Hodgson, may yet prove identical with the European *M. PIPISTRELLUS*; so far as we can judge from specimens of the former, presented to the Society's museum by Mr. Hodgson, but unfortunately, in bad condition, there is no difference whatever in size and structure from the European *PIPISTRELLUS*; but the fur of *M. PALLIDIVENTRIS* would seem to be more ruddy (and tending to *vinaceous*) above, and also more albescent on the lower-parts. Two affined but distinct species exist in *M. PARVIPES*, nobis (*J. A. S.* XXII, 581), from Masuri, and *M. THEOBALDI*, nobis (*pallidiventris* apud nos, *ibid*), from Kashmir. The latter is remarkable for the comparative great size of its foot, which with claws measures $\frac{1}{8}$ in.; and for its non-rufous dark dull brown fur above, and more or less albescent on the lower-parts.

E. BLYTH.

LIBRARY.

The following books have been added to the library since the 3rd of April last.

Presented.

Natuurkundig Tijdschrift voor Nederlandsch Indië, Vol. VII. Nos. 5 and 6, and Vol. VIII. Nos. 1 and 2.—BY THE EDITORS.

The Journal of the Indian Archipelago, Vol. VIII. Nos. 7 to 9, 2 copies.—BY THE GOVERNMENT OF BENGAL.

Selections from the Records of the Bengal Government, Nos. XV. XVII. and XIX. two copies each.—**By THE SAME.**

Reports with Proceedings and Appendix of the Committee appointed by Government to enquire into the State of River Hooghly, foolscap, folio.—**By THE SAME.**

Report on the Settlement in the district of Kangra in the Trans-Sutledge States, by G. C. Barnes, 4 copies.—**By THE CHIEF COMMISSIONER OF THE PUNJAB.**

The Indian Annals of Medical Science, No. 4.—**By THE EDITOR.**

The Oriental Christian Spectator, No. 3.—**By THE EDITOR.**

The Calcutta Christian Observer, for April, 1855.—**By THE EDITORS.**

Proceedings of the Royal Society, No. 8 —**By THE SOCIETY.**

The Oriental Baptist, No. 100.—**By THE EDITOR.**

The Upadeshak, No. 100.—**By THE EDITOR.**

Exchanged.

The London, Edinburgh and Dublin Philosophical Magazine, No. 57.

Purchased.

Comptes Rendus, Nos. 1 to 5 of 1855.

The Edinburgh Review, No. 205.

Journal des Savants pour Janvier, 1855.

Biblische Legenden der Muselmänner, von Dr. T. Weil, *Frankfort*, 1845, 12mo.

RA'JENDRALAL MITTRA,

May 1st, 1855.

FOR JUNE, 1855.

At the usual monthly general meeting of the Society held on the 6th instant,

Sir JAMES W. COLVILLE, Kt. President, in the chair.

The minutes of the last month's Proceedings were read.

Mr. Houstoun objected to certain passages in the record and which he pointed out as incorrect. On the minutes being confirmed, he handed in a protest in the following terms; viz. "I protest against this record being taken as a true and correct account of the proceedings of the Society."

Presentations were received—

1. A collection of oolitic and tertiary fossils from Rev. S. Hislop, and Rev. R. Hunter, with a few of the latter from W. W. Rawes, Esq. Madras Medical Service and Capt. Macauley, 23rd Regt. M. N. I.

The following is an extract from a letter dated 5th April last, from Mr. Hislop, which announced his intention to send these fossils.

"In an account of the proceedings of your last meeting (March 7th,) I was glad to notice the addition to your Museum of a fossil stem and leaves of *Cycas* from the Rajmahal hills, presented by Mr. Watson—also the announcement, by Captain Saxton, of the discovery of fossils in the Gungpore Rajah's territory. We have from here several stems, more especially in the laminated sandstone underlying, what used to be called in Peninsular India, the diamond sandstone, the former of which is the equivalent near the city of Nagpore of the *conglomerates* in the North of this Province, and on the banks of the Damuda and other parts of Bengal. If you could kindly obtain an outline drawing of the stem for me to compare with those here, I should feel much obliged to you. Could you also give me some idea, either by a drawing or written descriptions, of the genera of the Gungpore fossils? If you have in your Museum any other Indian sandstone and coal organisms over and above those published by McClelland in his geological survey, I should be much indebted to you, if you would have the goodness to favour me with a sketch of them for the purpose of comparison. What is *Pustularia Calderiana*, said to be found on the Damuda coal field?"

"Have you got any shells from the limestone found in connexion with the trap of the Rajmahal Hills which Capt. Sherwill considers a fresh water deposit?"

"As a sort of specimens of the rough sketches that would be useful to me I send you some hasty outlines of several of the fossils discovered here in our laminated sandstone and coal. Besides these Jurassic remains, which all appear to indicate fresh water deposit, we meet in a lacustrine stratum, generally underlain and overlain with trap, with an abundance of tertiary organisms, such as small bones, fish scales, the elytra of beetles, *Entomostraea* and *Mollusca*; and fruits, seeds, leaves, roots, and trunks of trees. These are, for the most part, so minute and numerous that it would take longer time to copy them for you, than I am able to afford. My colleague, the Rev. Mr. Hunter and myself have had packed up in a box for the last-year a selection of oolitic and tertiary fossils for your Museum, but we have not been able to hear of any convenient mode of transmission to Calcutta."

2. From J. Pontet, Esq. Rajmahal, impressions of Ferns (*Pecop-*

teris, Tænopteris) of *Ptilophyllum*, casts of stems, &c. in soft earthy sandstone, from Bindrabun, N. W. corner of Rajmahal Hills.

3. From Her Majesty's Government through the late Sir H. Dela-Bèche, the volumes hitherto published of Memoirs of the Geological Survey of Great Britain and of the Museum of Practical Geology, British Organic Remains, Records of the School of Mines, &c. and Dr. L. Playfair's Essay on Industrial Instructions on the Continent.

Capt. James, who kindly took charge of these books from Sir H. Dela-Bèche states :

"Sir Henry informed me that he was sorry he was not empowered to send a set of the beautiful Geological Maps which belong to these Memoirs, but he at the same time told me he had no doubt they would be furnished to the Asiatic Society of Bengal, if an application to that effect were made to the Lords of the Treasury by the Court of Directors.

"I therefore beg to propose, on account of the great interest attaching to these valuable Maps, that a letter be addressed to the Hon'ble the Court of Directors on the part of the Asiatic Society of Bengal, requesting that the Court will apply to Her Majesty's Government for a set of the Geological Survey Maps of the United Kingdom, to be placed in the Library of the Society."

4. From R. H. Maddocks, Esq. Deputy Commissioner, Gurudaspúr, four copper coins from a trove of thirty discovered in digging the foundation of a jail at Gurudaspúr. Three of the coins are of the reign of Sikandar Sháh Behlol of Delhi, and the fourth is illegible.

5. From Col. Goodwyn, two copies of a lecture delivered at the Bethune Society, being a project for the incorporation of a Society of Arts and Sciences in Bengal.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members.

T. Thompson, Esq. M. D. F. R. S.

J. W. Sherer, Esq. B. C. S.

Dr. W. Montgomerie, B. M. S. (re-elected).

The following were named for ballot at the next meeting :—

W. S. Atkinson, Esq. Principal of la Martinière,—proposed by Mr. Beadon and seconded by Mr. Grote.

T. C. Loch, Esq. B. C. S.—proposed by Mr. Riddell and seconded by Mr. Allen.

Mr. Houstoun gave notice of the following motion for the next meeting.

“That I may be allowed to see and have access to all papers, the property of the Society.”

The Council submitted reports.

1. Recommending that Mr. Hall's offer to edit the Aphorisms of the Nyáya with the Commentary of Rishi Vátsyáyana, for publication in the Bibliotheca Indica, be accepted.

2. Stating that they have elected, subject to the confirmation of the Society under the 60th Byelaw, Dr. Spilsbury, a Vice-President, and Mr. H. V. Bayley and Capt. James, members of the Council, in the room of Col. Baker and Capt. Thuillier resigned.

The recommendations were approved and adopted.

The President, after noticing the death and public services of Major-General Forbes, proposed “that the Society record its regret at the loss of one who for many years had been a valuable member, and was formerly one of the Vice-Presidents of the Society.”

Resolved accordingly.

Communications were received—

1. From J. J. Grey, Esq. Malda, enclosing a paper pointing out a simple method of manipulation in the Calotype process.

2. From Bábu Bádhanáth Sikdár, forwarding abstracts of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1854, and Jan. and Feb. 1855.

The Secretary then read the following correspondence which had taken place between the Government and the Council.

No. 1237.

*From the Under-Secretary to the Government of Bengal,
To the Secretary to the Asiatic Society.*

*Dated Lt.-Governor's Camp, Raneeunge, Zillah West
Burdwan, the 3rd March, 1855.*

[GENERAL.] “Sir,—I am directed to state that the Lt.-Governor, on the occasion of his recent visit to Rhotas, has observed with much regret that the remains of the old Palace there, in which the people of the whole surrounding country feel the liveliest and most unaffected in-

terest are, although the unquestioned property of Government, rapidly going to decay and that unless measures be taken to preserve them, they will certainly before long fall into irretrievable dilapidation.

"I am therefore desired to request that the Council of the Asiatic Society will favour the Lt. Governor with such information as they may possess on the subject of these ruins, and with an opinion as to whether their history and character is such as to warrant the Government in expending a moderate sum for their preservation.

I have, &c.

(Signed) H. PRATT,

Under-Secretary to the Government of Bengal."

*From the Secretary to the Asiatic Society,
To the Secretary to the Government of Bengal.*

Dated the 7th April, 1855.

SIR,—I am directed by the Council of the Asiatic Society to acknowledge the receipt of Mr. Under-Secretary Pratt's letter, dated the 3rd ultimo, No. 1237, and in reply to express on behalf of the Society the gratification which they derive from this announcement of his Honor's interest in the antiquities of the country.

Nearly all that is known of the history of the ruins on Rhotasguruh is compiled in the account of them given by Buch. Hamilton, published in the first Vol. of Martin's Eastern India. The stratagem by which the hill was first wrested from its Hindu Chief is narrated by Stewart in his history of Bengal.

A translation of the Sanscrit inscriptions dated 1631, over the *Kothoutiya Gate* of the Fort will be found in Vol. 8 of our Society's Journal, but the authenticity of the Genealogy contained in the inscriptions has never yet been satisfactorily worked out.

I am desired to add that, in the Society's opinion, all the standing ruins at Rhotas are well deserving of the attention of Government, and to express the pleasure with which they will co-operate, if permitted, in any measures which His Honor may take for preserving them from further dilapidation.

I have, &c.

(Signed) A. GROTE,

Secretary, Asiatic Society of Bengal.

The Secretary also exhibited to the meeting a portfolio of Entomological drawings placed at his disposal for the purpose, by Mr. R. W. G. Frith. The drawings represented the transformation of various Indian Lepidoptera, and were beautifully executed by a native artist, Moonshi Zainoolabdeen, who had been for some years employed by Mr. Frith.

From H. Piddington, Esq. submitting a twenty-fourth Memoir on the Law of Storms.

The Librarian submitted his usual monthly report.

LIBRARY.

The following have been the additions to the Library since the last meeting.

Presented.

A descriptive Catalogue of Bengali works, containing a classified list of fourteen hundred Bengali Books and Pamphlets. By the Rev. J. Long, *Calcutta*, 1855, 12mo.—BY THE AUTHOR.

On some species of *Amomum*, collected in Western Tropical Africa, by Dr. Daniell, by J. D. Hooker. Pamphlet.—BY THE AUTHOR.

Introductory Essay to the Flora of New Zealand, by J. D. Hooker, London, 1853, 4to.—BY THE AUTHOR.

On the Functions and Structure of the Rostellum of *Listera ovata*, J. D. Hooker, 4to p.—BY THE AUTHOR.

On a new species of *Volkamannia*, by J. D. Hooker, 8vo. p.—BY THE AUTHOR.

Chants Populaires de l'Inde, traduits par M. Garcin de Tassy, *Paris*, 1854, Rl. 8vo. Pamphlet.—BY THE AUTHOR.

Selections from the Records of the Government of India, No. VII. Punjab Road Report, *Calcutta*, 1854, 8vo.—BY THE GOVERNMENT OF INDIA.

Selections from the Records of Government of the North Western Provinces. No. XIX.—BY THE GOVERNMENT, N. W. P.

Selections from the Records of the Madras Government, No. X. Report on the Operations of the Indian Mints.—BY THE GOVERNMENT OF MADRAS.

The Cyclones of the Black Sea, by H. Piddington. *Calcutta*, 1855, 8vo. Pamphlet.—BY THE AUTHOR.

On a new method of keeping open the bed of the Ganges, by H. Piddington, Esq., *Calcutta*, 1855, 8vo. Pamphlet.—BY THE AUTHOR.

Proceedings of the Royal Society, Vol. VII. Nos. 9, 10.—BY THE SOCIETY.

The Oriental Christian Spectator for April, 1855.—BY THE EDITOR.

The Oriental Baptist for May, 1855.—BY THE EDITOR.

The Calcutta Christian Observer for May, 1855.—BY THE EDITORS.

Report of the Anjuman Islamy, 8vo. Pamphlet, Persian.—BY THE MAULUVI ABDUR RAUF.

Bibidhārtha Sangraha, No. 35.—BY THE EDITOR.

Tattwabodhini Patrikā, No. 112.—BY THE TATTWABODHINĪ SABHA'.

Durbin, a Persian newspaper for April, 1855.—BY THE EDITOR.

Memoirs of the Geological Survey of Great Britain and of the Museum of Economic Geology, *London*, 1854, 3 vols. 8vo.—BY J. H. DELA BECHE.

Records of the School of Mines, Vol. I. p. 2 —BY THE SAME.

Prospectus of the Metropolitan School of Science applied to Mining and the Arts.—BY THE SAME.

Museum of Practical Geology. Industrial Instruction on the Continent, by Lyon Playfair, *London*, 1852, 8vo. p.—BY THE SAME.

Purchased.

The Annals and Magazine of Natural History, Feb. 1855.

RA'JENDRALAL MITTRA.



*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February, 1855.*

Latitude 22° 33' 1" North, Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the Level of the Sea ^{feet} 18.11.

Daily Means, &c. of the Observations, and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	30.110	30.203	30.046	0.157	67.0	78.6	56.6	22.0
2	.095	.193	.013	.180	69.1	79.2	60.7	18.5
3	.098	.190	.034	.156	69.7	77.6	63.6	14.0
4	<i>Sunday.</i>							
5	.068	.139	.010	.129	71.0	79.0	63.4	15.6
6	.178	.264	.121	.143	69.9	79.2	61.7	17.5
7	.176	.266	.115	.151	70.8	79.0	64.4	14.6
8	.046	.138	29.960	.178	70.4	79.6	62.4	17.2
9	29.981	.053	.925	.128	72.5	82.2	64.0	18.2
10	30.040	.126	.995	.131	74.1	83.8	68.3	15.5
11	<i>Sunday.</i>							
12	29.998	.092	.925	.167	75.2	85.0	68.2	16.8
13	.947	.020	.889	.131	76.1	86.4	69.6	16.8
14	.935	.032	.866	.166	76.4	85.2	68.2	17.0
15	.903	29.985	.859	.126	75.3	84.2	69.4	14.8
16	.955	30.018	.895	.123	69.5	77.8	65.6	12.2
17	.964	.043	.894	.149	68.8	77.2	63.0	14.2
18	<i>Sunday.</i>							
19	.873	29.935	.790	.145	71.0	76.8	66.6	10.2
20	.889	.965	.823	.142	71.8	79.6	65.6	14.0
21	.982	30.072	.937	.135	71.5	80.2	64.0	16.2
22	.942	.030	.872	.158	72.1	81.0	62.8	18.2
23	.918	29.991	.861	.130	74.5	82.4	67.8	14.6
24	.962	30.029	.908	.121	75.4	84.2	68.8	15.4
25	<i>Sunday.</i>							
26	30.040	.137	.987	.150	76.5	86.2	67.6	18.6
27	.023	.122	.956	.166	75.3	86.0	65.0	21.0
28	.006	.089	.938	.151	76.4	86.8	66.4	20.4

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Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional weight of vapour required for complete saturation.	Mean degree of Humidity complete saturation being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	61.4	5.6	58.0	9.0	0.489	5.41	1.89	0.741
2	65.5	3.6	63.7	5.4	.591	6.52	.26	.838
3	66.7	3.0	65.2	4.5	.621	.84	.09	.863
4	Sunday.							
5	67.2	3.8	65.3	5.7	.628	.85	.40	.830
6	66.5	3.4	64.8	5.1	.613	.76	.22	.847
7	66.9	3.9	64.9	5.9	.615	.77	.43	.826
8	65.9	4.5	63.6	6.8	.590	.48	.62	.800
9	68.6	3.9	66.6	5.9	.651	7.12	.51	.825
10	70.5	3.6	68.7	5.4	.697	.61	.46	.839
11	Sunday.							
12	70.5	4.7	68.1	7.1	.684	.44	.93	.794
13	71.4	4.7	69.0	7.1	.704	.65	.98	.794
14	70.8	5.6	68.0	8.4	.681	.41	2.31	.762
15	68.3	7.0	64.8	10.5	.613	6.68	.72	.711
16	64.8	4.7	62.4	7.1	.567	.24	1.64	.792
17	65.1	3.7	63.2	5.6	.582	.41	.30	.831
18	Sunday.							
19	68.3	2.7	66.9	4.1	.657	7.22	.03	.875
20	67.7	4.1	65.6	6.2	.630	6.92	.53	.819
21	66.0	5.5	63.2	8.3	.582	.39	.99	.763
22	66.6	5.5	63.8	8.3	.593	.50	2.03	.762
23	68.7	5.8	65.8	8.7	.634	.91	.27	.753
24	71.2	4.2	69.1	6.3	.706	7.69	1.74	.815
25	Sunday.							
26	69.1	7.4	65.4	11.1	.626	6.80	2.95	.697
27	67.0	8.3	62.8	12.5	.574	.24	3.16	.664
28	68.1	8.3	63.9	12.5	.595	.46	.26	.665

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Hour.	Mean Height of the Barometer at 32° Faht.	Range of the Barometer for each hour during the Month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the Month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid-night.	30.006	30.205	29.844	0.361	68.7	73.0	61.4	11.6
1	29.996	.184	.840	.344	68.1	72.8	60.4	12.4
2	.986	.186	.838	.348	67.5	72.8	60.0	12.8
3	.978	.184	.828	.356	67.2	72.2	59.4	12.8
4	.972	.173	.823	.350	66.5	71.8	58.8	13.0
5	.978	.175	.836	.339	66.1	71.0	58.0	13.0
6	.999	.199	.852	.347	65.6	70.2	57.2	13.0
7	30 025	.214	.888	.326	65.3	69 6	56.6	13.0
8	.056	.240	.919	.321	67.6	72.6	60.4	12.2
9	.078	.253	.902	.351	70.6	77.4	64.6	12.8
10	.087	.266	.906	.360	73.6	79.9	67.9	12.1
11	.073	.247	.923	.324	76.1	81.8	69.3	12.5
Noon.	.048	.219	.904	.315	78.4	83.6	69.6	14.0
1	.014	.183	.860	.323	79.8	85.4	71.8	13.6
2	29.986	.165	.836	.329	80.8	86 8	74.8	12.0
3	.965	.145	.803	.342	81.2	86.8	73.4	13.4
4	.955	.136	.793	.343	80.6	86.4	69.0	17.4
5	.950	.131	.795	.336	79.3	85.4	69.6	15.8
6	.957	.145	.790	.355	76 5	82.0	68.5	13.5
7	.976	.181	.813	.368	74.5	78 8	68 2	10.6
8	.997	.197	.837	.360	73.0	77.2	68.0	9.2
9	30.011	.207	.853	.354	71.7	75.0	66.1	8.9
10	.017	.209	.865	.344	70.8	74.0	65.6	8.4
11	.014	.210	.868	.342	70.1	73.5	65.4	8.1

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in the month of February, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Hour.	Mean Wet Bulb Thermo- meter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional Weight of Va- pour required for com- plete saturation.	Mean degree of Humidity complete saturation be- ing unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	66.3	2.4	65.1	3.6	0.619	6.83	0.86	0.888
1	66.0	2.1	64.7	3.4	.611	.76	.79	.895
2	65.6	1.9	64.5	3.0	.607	.72	.70	.906
3	65.3	1.9	64.2	3.0	.601	.65	.70	.905
4	64.6	1.9	63.5	3.0	.588	.51	.68	.905
5	64.5	1.6	63.5	2.6	.588	.51	.59	.917
6	64.1	1.5	63.2	2.4	.582	.46	.54	.923
7	63.9	1.4	63.1	2.2	.580	.44	.49	.929
8	65.3	2.3	63.9	3.7	.595	.58	.86	.884
9	67.0	3.6	65.2	5.4	.621	.84	1.31	.839
10	68.8	5.1	65.9	7.7	.636	.95	.98	.778
11	69.6	6.5	66.3	9.8	.644	7.01	2.62	.728
Neon.	70.4	8.0	66.4	12 0	.646	.00	3.31	.679
1	70.6	9.2	66.0	13.8	.638	6.88	.87	.640
2	70.7	10.1	65.6	15.2	.630	.79	4.28	.613
3	70.5	10.7	65.1	16.1	.619	.67	.54	.595
4	70.0	10.6	64.7	15.9	.611	.58	.43	.598
5	69.9	9.4	65.2	14.1	.621	.72	3.87	.635
6	69.5	7.0	66.0	10.5	.638	.92	2.83	.710
7	69.1	5.4	66.4	8.1	.646	7.06	.12	.769
8	68.5	4.5	66.2	6.8	.642	.02	1.74	.801
9	68.0	3.7	66.1	5.6	.640	.01	.42	.832
10	67.8	3.0	66.3	4.5	.644	.08	.12	.863
11	67.4	2.7	66.0	4.1	.638	.02	.01	.874

Meteorological Observations.

xliii

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February, 1855.*

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the sky.
	°	Inches.		
1	132.5	0.74	S. W. or W.	Cloudless and slightly foggy during the day.
2	130.0		Calm or S.	Cloudless till 9 A. M. scattered \nearrow afterwards.
3	132.5		S. or S. E.	Scattered \searrow or \swarrow till 6 A. M. cloudless till 11 A. M. scattered \nearrow or \searrow afterwards.
4 Sunday.	128.2		E. or S.	More or less cloudy the whole day.
5	128.2		E. or variable.	Cloudy till 6 P. M. also rain, lightning and thunder between midnight and 8 A. M. cloudless after 6 P. M.
6	134.0		N. E. or N. W.	Cloudless nearly the whole day.
7	130.0		Calm or W. or S.	Ditto.
8	131.5		S. or S. E.	Cloudless till 6 A. M. various clouds till 5 P. M. cloudless afterwards.
9	136.2		S.	Cloudless till 2 A. M. various clouds till 6 P. M. cloudless afterwards.
10	139.0		S. or S. W.	Cloudless nearly the whole day.
11 Sunday.	137.0		S.	Cloudless till 7 A. M. scattered \searrow and \swarrow afterwards.
12	137.0		S. or S. W.	Cloudy till 6 A. M. cloudless till 10 A. M. scattered \searrow and \swarrow till 4 P. M. cloudless afterwards.
13	136.0		S. or S. W.	Cloudless till 6 A. M. scattered \searrow or \swarrow till 3 P. M. cloudless afterwards.
14	135.2		Calm or W. or N. W.	Cloudless till 5 A. M. cloudy afterwards, also drizzling between 4 and 5 P. M.
15	135.2	0.37	W. or S. W.	Scattered \searrow till 8 A. M. cloudy afterwards with drizzling between 4 and 5 P. M.
16	..		W. or S. S. E. or S.	Cloudy and raining till 8 A. M. only cloudy 7 P. M. cloudless afterwards.
17	115.0		S. or N. W.	Cloudless till 9 A. M. various clouds till 8 P. M. cloudless till 11 P. M.
18 Sunday.	134.0		N. W. or W.	Cloudless till 9 A. M. scattered \searrow till 6 P. M. cloudless afterwards.
19	134.0		S. W. or W.	Cloudless till 5 A. M. various clouds afterwards.
20	182.0		S. W. or W. or S.	Cloudless till 7 A. M. cloudy till Noon, scattered \searrow afterwards.
21	138.0		S.	Cloudless till 5 A. M. scattered \searrow till 7 P. M. cloudless afterwards.
22	136.0		S. or N. or W.	Cloudless.
23 Sunday.	140.0		S. W. or N. W. or S.	Scattered \searrow .
24	140.2		S. or W. or N.	Scattered \searrow .

\nearrow Cirri, \searrow Cirro-strati, \swarrow Cungi, \nwarrow Cumulo-strati, \nwarrow Nimbi, \nwarrow Strati, \nwarrow Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March, 1855.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the cistern of the Standard Barometer above the level of the Sea, 18.11 ^{feet.}

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahrt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempe- rature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.984	30.059	29.922	0.137	75.9	87.7	65.4	22.3
2	.972	.042	.890	.152	77.0	86.9	67.2	19.7
3	30.057	.131	.999	.132	71.8	74.2	69.2	5.0
4	<i>Sunday.</i>							
5	.019	.106	.955	.151	76.6	86.7	67.8	18.9
6	29.991	.069	.923	.146	78.1	85.9	70.8	15.1
7	.972	.045	.906	.139	77.5	88.0	70.5	17.5
8	.893	29.970	.821	.149	78.4	89.4	68.0	21.4
9	.854	.917	.796	.121	80.2	91.0	72.5	18.5
10	.849	.936	.775	.161	78.3	87.8	70.6	17.2
11	<i>Sunday.</i>							
12	.960	30.048	.908	.140	79.0	87.8	70.8	17.0
13	.961	.050	.884	.166	78.5	88.4	68.6	19.8
14	.863	29.945	.786	.159	78.6	89.2	69.8	19.4
15	.801	.878	.732	.144	79.1	87.1	72.8	14.3
16	.887	.984	.788	.196	74.6	82.6	70.4	12.2
17	.940	30.034	.885	.149	71.8	79.7	67.4	12.3
18	<i>Sunday.</i>							
19	.885	29.980	.801	.179	77.3	88.7	66.2	22.5
20	.796	.876	.719	.157	77.9	89.2	67.2	22.0
21	.738	.814	.666	.148	79.3	91.2	66.9	24.3
22	.761	.838	.699	.139	81.1	91.6	71.8	19.8
23	.788	.856	.716	.140	81.6	90.6	75.2	15.4
24	.804	.900	.729	.171	81.8	91.6	74.8	16.8
25	<i>Sunday.</i>							
26	.810	.889	.749	.140	83.2	93.5	76.2	17.3
27	.818	.891	.747	.144	84.5	94.4	76.2	18.2
28	.817	.906	.739	.167	84.7	95.3	77.4	17.9
29	.799	.874	.722	.152	84.3	96.4	75.6	20.8
30	.767	.864	.683	.181	85.1	96.7	77.4	19.3
31	.760	.831	.680	.151	84.5	94.0	79.8	14.2

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March, 1855.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Va- pour required for com- plete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	°
1	67.9	8.0	63.9	12.0	.0595	6.47	3.10	0.676-
2	69.5	7.5	65.7	11.3	.632	.87	.02	.695
3	68.2	3.6	66.4	5.4	.646	7.10	1.35	.840
4	<i>Sunday.</i>							
5	70.8	5.8	62.9	8.7	.679	.37	2.40	.754
6	72.4	5.7	69.5	8.6	.715	.74	.48	.757
7	71.7	5.8	68.8	8.7	.699	.57	.47	.754
8	71.0	7.4	67.3	11.1	.666	.21	3.10	.699
9	74.4	5.8	71.5	8.7	.763	8.23	2.65	.756
10	72.0	6.3	68.8	9.5	.699	7.56	.72	.735
11	<i>Sunday.</i>							
12	71.5	7.5	67.7	11.3	.674	.30	3.20	.695
13	70.8	7.7	66.9	11.6	.657	.11	.24	.687
14	72.8	5.8	69.9	8.7	.725	.84	2.54	.755
15	73.3	5.8	70.4	8.7	.736	.95	.58	.755
16	70.2	4.4	68.0	6.6	.681	.42	1.78	.807
17	68.9	2.9	67.4	4.4	.668	.33	.12	.867
18	<i>Sunday.</i>							
19	68.3	9.0	63.8	13.5	.593	6.42	3.56	.643
20	68.3	9.6	63.5	14.4	.588	.37	.79	.627
21	69.5	9.8	64.6	14.7	.609	.58	4.01	.621
22	73.8	7.3	70.1	11.0	.729	7.85	3.32	.708
23	75.4	6.2	72.3	9.3	.783	8.43	2.91	.743
24	75.6	6.2	72.5	9.3	.767	.47	.93	.743
25	<i>Sunday.</i>							
26	77.6	5.6	74.8	8.4	.849	9.11	.78	.766
27	77.4	7.1	73.8	10.7	.822	8.78	3.57	.711
28	74.7	10.0	69.7	15.0	.720	7.69	4.73	.619
29	75.7	8.6	71.4	12.9	.761	8.13	.15	.662
30	78.0	7.1	74.4	10.7	.838	.95	3.62	.712
31	79.4	5.1	76.8	7.7	.905	9.67	2.68	.783

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid-night.	29.881	30.037	29.744	0.293	74.8	80.8	69.8	11.0
1	.871	.030	.743	.287	74.1	80.6	69.0	11.6
2	.857	.017	.734	.283	73.6	80.1	68.2	11.9
3	.846	.007	.716	.291	73.0	80.2	67.0	13.2
4	.843	.001	.701	.300	72.5	80.0	66.6	13.4
5	.859	.015	.731	.284	72.0	79.8	66.2	13.6
6	.876	.030	.746	.284	71.7	79.8	65.4	14.4
7	.899	.067	.771	.296	71.8	80.4	65.6	14.8
8	.929	.097	.795	.302	75.3	82.6	68.6	14.0
9	.945	.110	.814	.296	78.5	86.2	70.6	15.6
10	.952	.131	.814	.317	81.8	89.0	70.3	18.7
11	.942	.122	.809	.313	84.0	91.4	70.8	20.6
Noon.	.913	.098	.766	.332	86.2	94.1	71.7	22.4
1	.882	.088	.735	.353	87.5	95.2	72.9	22.3
2	.849	.070	.698	.372	88.2	96.4	73.0	23.4
3	.825	.057	.679	.378	88.6	96.4	74.2	22.2
4	.812	.021	.667	.354	88.2	96.7	73.4	23.3
5	.809	.038	.666	.372	86.4	94.2	72.7	21.5
6	.812	.048	.675	.373	83.5	90.2	71.8	18.4
7	.829	.051	.690	.361	80.8	86.6	71.6	15.0
8	.849	.074	.708	.366	79.1	83.4	70.9	12.5
9	.871	.098	.727	.341	77.7	82.4	70.2	12.2
10	.883	.081	.740	.341	76.8	82.0	70.0	12.0
11	.879	.071	.743	.328	75.9	81.2	69.2	12.0

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Hour.	Mean Wet Bulb Thermo- meter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional weight of va- pour required for com- plete saturation.	Mean degree of Humidity, complete saturation be- ing unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	71.1	3.7	69.2	5.6	0.708	7.72	1.54	0.834
1	70.7	3.4	69.0	5.1	.704	.68	.39	.847
2	70.3	3.3	68.6	5.0	.695	.59	.34	.850
3	69.9	3.1	68.3	4.7	.688	.52	.24	.858
4	69.8	2.7	68.4	4.1	.690	.56	.07	.876
5	69.2	2.8	67.8	4.2	.677	.42	.08	.873
6	69.1	2.6	67.8	3.9	.677	.42	.01	.880
7	69.2	2.6	67.9	3.9	.679	.45	.00	.882
8	70.9	4.4	68.7	6.6	.697	.58	.82	.806
9	72.4	6.1	69.3	9.2	.711	.69	2.66	.743
10	73.5	8.3	69.3	12.5	.711	.63	3.77	.669
11	74.1	9.9	69.1	14.9	.706	.55	4.62	.620
Noon.	74.6	11.6	68.8	17.4	.699	.45	5.54	.574
1	74.9	12.6	68.6	18.9	.695	.38	6.11	.547
2	75.4	12.8	69.0	19.2	.704	.47	.29	.543
3	76.1	12.5	69.8	18.8	.722	.65	.27	.550
4	75.9	12.3	69.7	18.5	.720	.63	.13	.555
5	75.4	11.0	69.9	16.5	.725	.71	5.35	.590
6	74.6	8.9	70.1	13.4	.729	.82	4.18	.652
7	74.0	6.8	70.6	10.2	.741	.99	3.08	.722
8	73.2	5.9	70.2	8.9	.732	.91	2.62	.751
9	72.6	5.1	70.0	7.7	.727	.87	.23	.779
10	72.2	4.6	69.9	6.9	.725	.87	1.96	.801
11	72.0	3.9	70.0	5.9	.727	.90	.67	.825

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March, 1855.
Solar radiation, Weather, &c.*

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the Sky.
	0	Inches.		
1	140.4	..	S. or S. W. or N. or N. W.	Scattered \sim i or \sim i till 9 A. M. cloudless afterwards.
2	135.4	..	N. or E. or S.	Cloudless till 5 A. M. scattered \sim i afterwards.
3	..	..	S. W. or N. W. or S. E.	Cloudy the whole day, also occasionally drizzling.
4	Sunday.	..		
5	137.0	..	Variable.	Cloudless till 1 P. M. scattered \sim i.
6	137.0	..	S.	Scattered \sim i and \sim i or \sim i till 8 P. M. cloudless afterwards.
7	137.6	..	S. or S. W. or N. W.	Cloudless nearly the whole day.
8	136.8	..	W. or S. W.	Cloudless till 5 A. M. scattered \sim i and \sim i till 3 P. M. cloudless afterwards.
9	137.5	..	N. W. or N.	Cloudless.
10	137.0	..	W.	Cloudless till 6 A. M. cloudy till 6 P. M. cloudless afterwards.
11	Sunday.	..		
12	139.0	..	S. or N. or W.	Cloudless.
13	139.5	..	N. W. or N.	Cloudless till noon scattered \sim i till 7 P. M. cloudless afterwards.
14	136.5	..	N. W. or S. W. or S.	Cloudless till 5 A. M. various clouds afterwards.
15	..	..	S. or W.	Cloudless till 5 A. M. cloudy till 7 A. M. cloudless afterwards.
16	..	..	S. or W. or S. W.	Cloudless till 6 A. M. cloudy afterwards also drizzling at 5 P. M.
17	120.0	..	S. W. or W.	Cloudy till 4 P. M. , also drizzling from 9 A. M. to 11 A. M. cloudless, after 4 P. M.
18	Sunday.	..		
19	144.0	..	S. or W. S. W.	Cloudless.
20	141.5	..	S. W. or N. W. or S.	Cloudless.
21	140.9	..	W. or S.	Cloudless.
22	138.5	..	S. or S. W.	Cloudless till noon, more or less cloudy afterwards.
23	134.0	..	S. W. or S. or S. E.	Cloudy till 10 A. M. cloudless till 7 P. M. cloudy afterwards.
24	143.7	..	S. or S. W.	Cloudy.
25	Sunday.	0.14		
26	143.0	..	S. or S. W.	Cloudless nearly the whole day.
27	136.0	..	S. or S. W.	Cloudless till 1 P. M. scattered \sim i afterwards.
28	137.3	..	S. or S. W.	Cloudy till 7 A. M. various clouds afterwards. Scattered \sim i till 8 A. M. cloudless afterwards.
29	146.5	..	S. or W.	Cloudless till 3 P. M., cloudy afterwards.
30	149.0	..	S. or W.	Cloudless till 3 P. M., cloudy afterwards.
31	137.0	..	S. or S. W.	Cloudy nearly the whole day.

\sim Cirri, \sim Cumuli, — Strati \sim i Cirro-cumuli, \sim i Cirro-strati, \sim i Cumulo-strati, \sim i Nimbi.

Meteorological Observations kept at the Residency, Lucknow. Lat. 26 51.18, Long. 81 for the Month of August, 1854.

Date.	AT 6 A. M.				AT 9 P. M.				NOON.			
	Thermometer.		Force and direction of Wind.	Aspect of Sky.	Thermometer.		Force and direction of Wind.	Aspect of Sky.	Thermometer.		Force and direction of Wind.	Aspect of Sky.
	Wet Bulb.	Dry Bulb.			Wet Bulb.	Dry Bulb.			Wet Bulb.	Dry Bulb.		
1	81	84	N. lt.	Cumuli.	82	86	S. E. lt.	.....	80	86	S. E. F. variable under	Hazy : rain.
2	79	82	Ditto.	Cumuli.	83	89	S. E. lt.	Cumuli.	82	90	S. E. lt.	Cumuli.
3	80	84	S. E. lt.	Cirro-cumuli.	83	89	S. E. lt.	Ditto.	81	89	S. E. lt.	Ditto.
4	81	85	S. W. lt.	Cirro.	82	87	S. E. lt.	Ditto.	82	85	S. E. lt.	.....
5	80	83	.....	Cumulo-strati.	81	84	S. E. lt.	Strati.	82	85	S. E. lt.	Cumulo-strati.
6	81	83	Ditto.	Ditto.	82	85	S. E. lt.	Ditto.	83	85	W. lt.	Strati : rain.
7	80	83	Ditto.	Cirro-strati.	81	84	W. lt.	Ditto.	81	83	W. lt.	Strati : rain.
8	80	83	W. lt.	Ditto.	81	83	S. W. lt.	Strati.	81	83	W. lt.	.....
9	80	83	Ditto.	Strati.	81	82	S. W. lt.	Strati.	81	83	W. lt.	.....
10	78	81	Ditto.	Ditto.	81	83	S. W. lt.	Ditto.	82	85	S. W. lt.	Cumulo-strati.
11	80	81	S. lt.	Cirro-strati.	81	83	S. lt.	Rain.	82	86	Calin.	Cumulo-strati.
12	80	82	Light.	Cumulo-strati	81	83	W. lt.	Strati.	82	86	S. lt.	Cumuli.
13	80	82	Ditto.	Cumulo-strati	80	83	S. W.	Cumulo-strati.	82	84	S. E. lt.	Cumulo-strati.
14	80	83	S. lt.	Cirro-strati.	81	83	N. W. lt.	Ditto.	82	84	S. E. lt.	Strati : rain.
15	80	82	Calin.	Ditto.	81	83	N. E. lt.	Strati.	81	84	W. lt.	Rain.
16	80	81	Ditto.	Strati.	81	82	W. lt.	Cumulo-strati.	80	83	W. lt.	.....
17	78	80	.....	Cirro-cumuli	80	83	W. lt.	Ditto.	81	84	W. lt.	Cumulo-strati.
18	78	80	W. lt.	Ditto.	81	82	W. lt.	Ditto.	81	84	W. lt.	.....
19	79	81	Ditto.	Ditto.	82	84	S. W. lt.	Ditto.	81	84	W. lt.	.....
20	80	82	Ditto.	Ditto.	82	84	S. W. lt.	Ditto.	81	84	W. lt.	.....
21	81	82	S. E. lt.	Ditto.	83	85	S. lt.	Strati.	81	84	W. lt.	.....
22	80	82	.....	Strati : rain.	81	82	N. lt.	Rain.	81	82	N. lt.	Rain.
23	80	82	N. lt.	Rain.	81	82	N. lt.	.....	81	82	N. lt.	Ditto.
24	77	79	S. W. f.	Ditto.	81	84	W. lt.	.....	80	84	S. W. lt.	Cumuli.
25	78	80	S. W. lt.	Cirro-strati.	81	86	W. lt.	Cirro.	82	87	W. lt.	Cirro.
26	79	82	S. W. lt.	Clear.	81	86	Ditto.	Clear.	82	89	W. lt.	Clear.
27	79	83	W. lt.	Ditto.	81	86	Ditto.	Clear.	80	96	W. lt. F.	Ditto.
28	79	84	Ditto.	Cirro.	81	86	Ditto.	Clear.	81	91	W. lt.	Ditto.
29	79	84	Ditto.	Ditto.	81	86	S. lt.	Clear.	83	91	S. W. lt.	Cirro-cumuli.
30	81	84	S. lt.	Ditto.	83	89	S. lt.	Clear.	83	92	S. E. lt.	Ditto.
31	83	86	.....	.....	83	89	S. lt.	Clear.	83	92	S. E. lt.	.....
Total.	2232	2303	1459	.....	2191	2280	1565	.....	1872	1981	1276	.....
Avg.	79.714	82.250	29.520	.....	81.148	84.444	29.520	.....	81.391	86.130	29.580	.....

Meteorological Observations kept at the Residency, Lucknow. Lat. 26-51-18, Long. 81 for the Month of August, 1854.

At 3 P. M.				At 6 P. M.			
Thermometer.		Force and direction of Wind.	Aspect of Sky.	Thermometer.		Force and direction of Wind.	Aspect of Sky.
Wet Bulb.	Dry Bulb.	° F.	° C.	Wet Bulb.	Dry Bulb.	° F.	° C.
84	84	N. lt.	Cumulo-strati.	80	83	.40	Cumulo-strati.
83	82	E. lt.	Cirro-cumuli.	82	85	.45	Ditto.
82	82	S. lt.	Cumuli.	82	88	.42	Cumuli
81	81	E. lt.	Ditto.	81	89	.44	Cirro-cumuli.
82	83	N. lt.	Ditto.	82	88	.44	Cumuli.
83	82	S. E. lt.	Cumulo-strati.	82	85	.45	Cumulo-strati.
82	85	S. W. lt.	Rain.	82	85	.38	Cumulo-strati.
80	82	W. lt.	.....	80	83	.42	Strati.
81	84	Ditto.	Cumuli.	81	83	.45	Cumulo-strati.
82	86	S. E. lt.	Cumulo-strati.	80	84	.41	Ditto.
82	85	Ditto.	Cumuli.	..	..	..	.....
82	85	..	..	..	..	..	.....
82	85	W. lt.	Rain.	..	..	..	W. lt.
82	84	S. lt.	Cumuli.	79	81	.38	Ditto.
82	84	Strat. : rain.	.....	81	83	.60	Strati.
80	84	..	Strati.	..	..	..	.....
81	84	Lk.	.....	..	..	..	.....
81	84	W. lt.	Cumulo strati.	..	..	..	.....
81	85	..	.....	82	85	.38	Cumuli.
81	85	N. lt.	Cumulo-strati.	..	..	..	.....
82	82	W. lt.	Ditto.	..	..	..	.....
79	81	S. W. lt.	Ditto.	..	..	..	.....
80	85	W. lt.	Cumuli.	80	86	.62	Cumuli.
82	88	Lk.	Ditto.	..	..	..	.....
80	81	..	.....	..	..	..	.....
80	91	W. lt.	Cirro-cumuli.	81	90	.58	Cirro-cumuli.
81	91	S. lt.	Cumuli.	81	90	.60	Cumuli.
84	91	S. E. lt.	.....	..	..	..	.....
1870	1978	..	....	1295	1368	.742	.....
86.230	29.489	..	....	80.937	85.500	29.464	.....

Abstract of the Meteorological Register for August, 1854.

Lucknow, 1st September, 1854.

Thermometer 6 A. M.			Thermometer 9 A. M.			Thermometer Noon.			Thermometer 3 P. M.			Thermometer 6 P. M.			Remarks.
Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	
Wet... 83	77	79.714	83	80	81.1.48	83	79	81.391	84	79	81.304	82	79	80.937	Prevailing winds this month, S. E. and W. but generally variable. Weather cloudy. Rain fell on 21 days. The heaviest fall on the 24 and 25. Total quantity 19.18. The atmosphere of course damp and loaded with moisture. Mean temperature of the month, S. West 80.899. Dry 84.911. Ditto
Dry... 86	79	82.250	89	82	84.444	96	81	86.130	91	81	86.230	90	81	85.500	
Barometer 6 A. M.			Barometer 9 A. M.			Barometer Noon.			Barometer 3 P. M.			Barometer. 6 P. M.			
Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	
29.64	29.40	29.520	29.72	29.45	29.581	29.69	29.46	29.580	29.66	29.38	29.489	29.62	29.38	29.464	

J. FAYRER, M. D., F. R. C. S.

Meteorological Observations kept at the Residency, Lucknow. Lat. 26-51-18. Long. 81, for the Month of September, 1854.

Date.	AT 6 A. M.				AT 9 A. M.				NOON.			
	Thermometer.		Force and direction of Wind.	Aspect of Sky.	Thermometer.		Force and direction of Wind.	Aspect of Sky.	Thermometer.		Force and direction of Wind.	Aspect of Sky.
	Wet Bulb.	Dry Bulb.			Wet Bulb.	Dry Bulb.			Wet Bulb.	Dry Bulb.		
1	83	86	S. W. lt.	Cirri.	29.65	90	S. E. lt.	Cumuli.	.82	88	S. E. lt.	Cumuli.
2	80	83	E. lt.	Cumulo-strati.	.65	87	E. lt.	....	.83	87	Ditto.	Ditto.
3	80	83	W. lt.	Ditto.	.68	83	S. W.	Cumuli.	.70	89	Ditto.	Ditto.
4	82	85	S. E. lt.	Cirri.	.66	83	S. E. lt.	Ditto.	.62	87	Ditto.	Ditto.
5	82	85	Ditto.	Ditto.	.60	88	S. E. lt.	....	.62	88	Ditto.	Ditto.
6	82	85	Ditto.	Cirro-cumuli.	.62	83	S. E. lt.	Cumuli.	..	..	..	..
7	80	84	S. E. F.	Cumulo-strati.	.62	81	S. lt.	Ditto.	..	..	..	..
8	80	83	E. lt.	Ditto.	.58	85	S. lt.	....	.56	88	S. E. F.	Cumuli.
9	81	84	S. E. lt.	Cirri.	.56	81	N. E. lt.	Cirro-cumuli.	.58	89	S. E. F.	Ditto.
10	80	84	E. lt.	Cirro-cumuli.	.68	86	S. lt.	Cumuli.	.72	81	E. lt.	Ditto.
11	81	84	Ditto.	Cirri.	.72	88	S. E. lt.	Cirri.	.73	91	S. E. lt.	Ditto.
12	81	84	Ditto.	Clear.	.68	86	Ditto.	Cumuli.	..	..	..	..
13	80	84	Ditto.	Cirro-strati.	.48	79	S. E. lt.	Strati : rain.	.44	85	S. E. lt.	Cumuli.
14	77	80	S. E. lt.	Strati : rain.	.32	78	E. F.	Ditto.	.38	82	Ditto.	Strati : rain.
15	77	78	W. lt.	Cirro-cumuli.	.52	80	S. lt.	....	..	..	..	..
16	77	80	Ditto.	Cumulo-strati.	.68	83	N. W. lt.	Cirro-cumuli.	.68	85	W. lt.	Cumuli.
17	76	79	Ditto.	Clear.	.66	80	S. W. lt.	....	.70	85	S. W. lt.	Ditto.
18	78	81	S. W. lt.	Cirro-strati.	.70	84	S. W. lt.	Cirro-cumuli.	.72	84	Ditto.	Strati : R. rain.
19	78	80	E. lt.	Clear.	.72	83	Ditto.	Clear.	.76	87	Ditto.	Cumuli.
20	80	82	W. lt.	Ditto.	.78	81	Ditto.	Ditto.	..	..	..	..
21	80	82	Ditto.	Ditto.	.80	85	Ditto.	....	..	..	..	..
22	78	80	E. lt.	Cumulo-strati.	.82	83	S. E. lt.	Cirri	.85	89	W. lt.	Clear.
23	79	82	S. E. lt.	Clear.	.82	81	S. lt.	Clear.	.86	88	S. E. lt.	Cumuli.
24	..	..	..	....	..	85	S. lt.	Ditto.	..	..	..	..
25	79	82	S. E. lt.	Clear.	.82	88	S. E. lt.	Ditto.	..	..	..	..
26	77	81	Ditto.	Cirro cumuli.	..	81	Ditto.	Cumuli.	..	..	..	..
27	73	76	N. E. F.	Cirro-strati.	..	77	..	....	..	..	N. W. F.	Rain.
28	74	76	S. E. lt.	Strati.	..	80	S. E. lt.	....	..	80	E. lt.	Cumuli.
29	75	77	Ditto.	Cumulo-strati	..	80	S. E. lt.	Cumuli.	..	82	Ditto.	Ditto.
30	76	78	Ditto.	Cumuli.	.78	82	Ditto.	Ditto.	..	84	Ditto.	Ditto.
total.	2286	2370	1977	....	1690	1867	1641	....	1769	1893	..	....
avg.	78.828	81.724	29.682	..	80.476	84.864	29.746	....	80.409	86.045	..	....

Meteorological Observations kept at the Residency, Lucknow. Lat. 26-51-18, Long. 81, for the Month of September, 1854.

At 3 P. M.										At 6 P. M.							
Thermometer.		Force and direction of Wind.		Aspect of Sky.		Thermometer.		Barometer.		Force and direction of Wind.		Aspect of Sky.		Rain Gauge Inches.		Remarks.	
Wet Bulb.	Dry Bulb.	° F.	° C.	S. E. F.	S. E. C.	Thunder-rain- [cumuli.	Wet Bulb.	Dry Bulb.		S. E. lt.	Ditto.	Cumuli.	Ditto.	Cirro-cumuli.	..	Heavy squall of wind and rain with thunder @ 2 P. M. to 3 P. M.	
81	86	29.62	85	S. E. F.	S. E. C.	Thunder-rain- [cumuli.	83	87	29.38	S. E. lt.	Ditto.	Cumuli.	Ditto.	Cirro-cumuli.	.9	Heavy rain last night with thunder- [storm].	
83	90	.60	88	S. E. lt.	S. E. C.	Thunder-rain- [cumuli.	83	88	.65	Ditto.	Ditto.	Cumuli.	Ditto.	Cirro-cumuli.	1.6	Showers.	
..	..	..	..	..	..	Thunder-rain- [cumuli.	82	88	.60	lt.	..	Cumuli.	Ditto.	Cirro-cumuli.	.2	Ditto.
83	89	.58	86	S. E. lt.	S. E. C.	Thunder-rain- [cumuli.	..	..	..	..	..	..	..	..	..	Fresh breezes during the day.
80	89	.52	86	S. E. F.	S. E. C.	Thunder-rain- [cumuli.	..	..	..	S. E. lt.	..	Cumulo-strati.	..	..	..	Ditto.
81	89	.54	86	E. lt.	E. C.	Thunder-rain- [cumuli.	81	86	.58	S. E. lt.	..	Cumulo-strati.	..	..	0.2	Shower at 6 P. M.
..	..	.62	88	S. E. lt.	S. E. C.	Thunder-rain- [cumuli.	81	91	.61	S. E. lt.	..	Cumuli.	..	..	..	..
80	90	.54	88	Ditto.	Ditto.	Thunder-rain- [cumuli.	..	..	..	E. lt.	..	..	..	..	..	..
80	83	.46	83	S. E. F.	S. E. C.	Thunder-rain- [cumuli.	79	83	.44	E. lt.	..	Strati.	..	..	0.6	Rain at 4 P. M. [and lightning.
80	83	.38	83	W. lt.	W. C.	Thunder-rain- [cumuli.	..	..	.62	N. E. lt.	..	Cumuli.	..	..	5.7	Heavy rain all night with thunder
78	85	.58	85	N. E. lt.	N. E. C.	Thunder-rain- [cumuli.	80	85	.62	N. E. lt.	..	Cumuli.	..	..	0.2	Light rain yesterday.
79	85	.62	86	W. lt.	W. C.	Thunder-rain- [cumuli.	79	85	.62	W. lt.	..	Clear.	..	..	.3	..
81	86	.66	86	S. W. lt.	S. W. C.	Thunder-rain- [cumuli.	..	..	..	..	..	..	..	..	..	..
80	83	.70	83	Ditto.	Ditto.	Thunder-rain- [cumuli.	..	..	.72	S. W. lt.	..	Cirro-cumuli.	..	..	.1	Rain at 2 P. M.
81	87	.73	87	Ditto.	Ditto.	Thunder-rain- [cumuli.	82	86	.75	Ditto.	..	Clear.	..	..	..	..
82	87	.74	87	Ditto.	Ditto.	Thunder-rain- [cumuli.	82	88	.80	W. lt.	..	Ditto.	..	..	0.2	Light rain and thunder in the night.
..	..	..	..	..	..	Thunder-rain- [cumuli.	88	86	.78	S. E. lt.	..	Ditto.	..	..	..	..
..	..	..	..	..	..	Thunder-rain- [cumuli.	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	Thunder-rain- [cumuli.	..	..	..	..	..	..	..	..	..	..
78	84	.84	84	S. E. lt.	S. E. C.	Thunder-rain- [cumuli.	..	..	..	..	..	..	..	..	..	..
76	84	.84	84	E. F.	E. C.	Thunder-rain- [cumuli.	73	82	.85	F.	..	Cumuli.	..	..	0.1	[ning yesterday at 6 P. M.
..	..	..	..	..	..	Thunder-rain- [cumuli.	74	77	.78	E. lt.	..	Strati lt. rain.	..	..	.85	Showers with squall of wind light-
78	80	.80	80	S. E. lt.	S. E. C.	Thunder-rain- [cumuli.	..	..	..	..	..	..	..	..	.60	Fresh gale during the night from
78	82	.80	82	Ditto.	Ditto.	Thunder-rain- [cumuli.	..	..	..	..	..	..	..	..	.20	E. and N. E.
78	84	.85	84	Ditto.	Ditto.	Thunder-rain- [cumuli.	..	..	..	..	..	..	..	..	..	..
1597	1716	1302	..	..	..	Thunder-rain- [cumuli.	1211	1286	980	..	..	..	..	..	11.05	....
79,850	85,800	29,615	..	..	..	Thunder-rain- [cumuli.	80,733	85,733	29,653	..	..	..	..	..	..	..

Abstract of the Meteorological Register for September, 1854.

Lucknow, 1st October, 1854.

Thermometer 6 A. M.			Thermometer 9 A. M.			Thermometer Noon.			Thermometer 3 P. M.			Thermometer 6 P. M.			Remarks.
Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	
Wet, .. 83	73	78.828	83	77	80.476	83	75	80.409	83	78	79.850	88	73	80.733	Prevailing winds this month S. E. but frequently variable and light. Rain fell on 15 days The heaviest fall on the 3 and 14. Total quantity of rain 11.05. The atmosphere damp. The weather close and oppressive being generally overcast with Cumuli, &c. Mean temperature of the month Wet bulb. 80.056. Dry, 84.833.
Dry, .. 86	76	81.724	90	80	84.864	91	78	86.045	90	80	85.800	91	77	85.733	
Barometer 6 A. M.			Barometer 9 A. M.			Barometer Noon.			Barometer 3 P. M.			Barometer 6 P. M.			
Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	
29.82	29.32	29.682	29.94	29.38	29.746	29.86	29.38	29.706	29.85	29.38	29.615	29.85	29.38	29.653	

J. FAYRE, M. D. F. R. G. S.

ERRATA.

Page	line	
308	13	<i>for "Su-Newe" read "Su-mwe"</i>
—	34-35	<i>for "tassi" read "tapi."</i>
309	1-2	<i>for "tassi" read "tapi."</i>
—	4-5	<i>for "inteo" in three places read "mteo."</i>
	29	<i>for "M-angu" read "M-anga."</i>
311	17	<i>for "bu" read "bri."</i>
—	21	<i>for "huv-go" read "bui-go."</i>
312	6	<i>for "So lung" read "So hing."</i>
—	21	<i>for "cha-lung" read "cha-hing."</i>
—	30	<i>for "Nya", read "Nyo."</i>
—	32	<i>for "tap pe ke ku chenema" read "tappe ke ku chenena."</i>
313	17	<i>for "Mum" read "Nunu."</i>
—	23	<i>for "Egj" read "e g."</i>
—	31	<i>for "kai apai" read "kai dpai."</i>
314	2	<i>for "klan" and "klau kapluk" read "klau" and "klau kaplak."</i>
—	23	<i>for "kadun" read "kadnu."</i>
—	25	<i>for "Si kamcheng kadun" read "Ti kancheng kadnu."</i>
—	32	<i>for "Kambum" read "Kambrum."</i>

JOURNAL

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No. V.—1855.

On the Epoch of the GUPTA Dynasty.—By E. THOMAS,
Esq., B. C. S.

In the year 1848, I submitted to the Royal Asiatic Society of London, a Memoir on the Dynasty of the Sáh kings of Sauráshtra. The object I therein proposed to myself, was to test—through the medium of coins, inscriptions and written history—the definite epoch at which the rule of these Princes might most fitly be fixed. In approaching the more specific aim of my enquiry, I had necessarily to examine the dates seemingly most appropriate to certain other races of kings, whose history bore directly or indirectly on the subject under review.

Prominent among these was the family of the Guptas, whose monumental records are extant from the Northward of the Ganges to Guzrát, and whose coins alike indicate a well sustained supremacy, spreading from the Himálayas to the Western coast.

Of the various works put under contribution to elucidate my theme, the most valuable, perhaps, was the “*Fragmens Arabes et Persans relatifs a l’Inde*” then but newly published by M. Reinaud.

This volume supplied me with several interesting extracts from the original Arabic MS. of Abú Rihán Al Birúní, an author, who had visited India during the reign of Mahmúd of Ghazni. One of the deductions I arrived at on the testimony of the Arabic text was, that the rule of the Guptas, preceded that of the Valabhis—the era of the latter dating from 319 A. D.

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This position has been contested by Major A. Cunningham in his book on "the Bhilsa Topes." Now, as the Gupta era, forms a highly important time-mark in the general scheme of Indian history, I may, I think, fairly claim a hearing while examining the question somewhat in detail.

It is a frequent and often deserved reproach against the more determined of the class "Antiquary," that the tendency of such researches is to enlarge the faculty of ingenuity at the expence of comprehensive intelligence. Seldom has been seen a more apt illustration of the justice of this popular accusation, than is afforded in the work just cited. My critic, after a very elaborate collation of minute coircidences—most of them more seeming than real—and an accumulation of a mass of materials, he imagines to be suitable for his purpose—succeeds in raising up a most imposing superstructure, the single fault of which consists in its foundations resting on the veriest sand. Neither can I compliment Major Cunningham on the candour with which he has conducted his cause; he states the bare conclusions I have come to, but usually abstains from informing his readers of the grounds whereon I base my inferences, while his own arguments are paraded in all their exparte advantage.

I must premise, before I proceed to test the value of the criticisms passed on one of my earliest essays, that I neither then was, nor am I now wedded to any particular theory, I should have sincerely rejoiced, if, out of my errors, the truth could have been developed; my speculations—avowedly conjectural in themselves—were put forward with sufficient humility, and therefore I should not consider myself in any way compromised by the subsequent enunciation of any more plausible theory—but, having been attacked, I feel bound to justify myself—with what success it will be for others to decide.

Major Cunningham* opens his argument by objecting to the authority I quote; he first impugns the validity of the statement in

* I reprint almost entire Major Cunningham's case against me, arranging it in detached portions, with a view to bring its various headings, as nearly as may be, into juxta-position with the opening portions of my replies. I commence my quotations at Ch. XII. par. 1, page 138.

the original text of Al Birúní, and then proceeds to the somewhat bold expedient of proposing a translation, that is to supersede that of M. Reinaud, the Professor of Arabic in the Oriental College of Paris! The latter I shall leave to defend himself, but it is necessary for me to state at once, that *the* amended version is pronounced erroneous by all the Arabic scholars, European and Native to whom I have submitted the passage in question.* But the most unaccount-

"Abu Rihán who in his account of Indian eras, identifies the GUPTA KÁL, or Gupta era, with the BALLABA KÁL, or era of *Balabhi*, which commenced in A. D. 319. These eras are mentioned no less than three times by Abu Rihán; and each time he has identified them as starting from the same date. But it appears to me that the most important of these passages must either be corrupt or obscure, for the translation given by M. Reinaud makes the epoch of the Guptas commence from the date of their extermination! If this is a correct translation, there can be little doubt that the text of Abu Rihán must be erroneous; for we know positively that the Guptas were reigning during the fifth and sixth centuries of our era. But I will venture to suggest a different translation of this important passage, by which the error is got rid of, without any alteration of the text:—[here follows the Arabic text introduced with M. Reinaud's French Translation, page 332]. "With regard to the *Gupta kál* (or era of the Guptas) the name was that of a wicked and powerful family; *whose epoch became extinct with themselves*; and truly Ballaba was after them; for the beginning of their era is the same as (that of) the last (namely) 241 of the SÁKA KÁL."

The underlined passage in the original text is thus translated by M. Reinaud: "et l'ère qui porte leur nom est l'époque de leur extermination;" but the literal translation appears to be, "and then became extinct along with their epoch," which agrees with the version that I have given above.

The statement made in M. Reinaud's version is so extraordinary that, even without any direct proofs of its inaccuracy, I would have set it aside as erroneous. The era of the Seleukidæ began with the foundation of the Syrian empire by Seleukos; the Christian era is dated from the establishment of Christianity; and the era of the Guptas without doubt commenced with the settlement of their own dynasty. For the Guptas, as I have mentioned before, date their inscriptions in an era of their own; which, though not so named by them, was actually a *Gupta kál*, and must, therefore, have been called such by the people.—*Bh. Topes*, p. 140.

* In order to put my readers in possession of the statements of Al Birúní in all their integrity, I append the French Translation of all that refers to the Gupta era, inserting likewise the original Arabic of the disputed passage.

"On emploie ordinairement les ères de Sri-Harscha, de Vikramaditya, de Saca, de Ballaba et des Gouptas. * * L'ère de Saca, nommée par les Indiens Saca-

able portion of the ratiocination advocated by Major Cunningham is that even taking his improved reading, he, in effect, concedes to me all I demand; I assumed from the original passage, that the

kāla, est postérieure à celle de Vikramaditya de 135 ans. Saca est le nom d' un prince qui a régné sur les contrées situées entre l' Indus et la mer. Sa résidence était placée au centre de l'empire, dans la contrée nommée Aryavartha * * Vikramaditya marcha contre lui, mit son armée en déroute et le tua * * Cette époque devint célèbre, à cause de la joie que les peuples ressentirent de la mort de Saca, et on la choisit pour ère, principalement chez les astronomes.

Ballaba, qui a donné aussi son nom à une ère, était prince de la ville de Ballaba, au midi de Anhalouara, à environ trente yodjanas de distance. L'ère de Ballaba est postérieure à celle de Saca de 241 ans. Pour s'en servir, on pose l'ère de Saca et l'on en ôte à la fois le cube de 6 (216) et le carré de 5, (25). Ce qui reste est l'ère de Ballaba. Il sera question de cette ère eu son lieu."

Before continuing the French translation, I insert the Arabic text of the disputed passage.

واما تاريخ بلب وهو صاحب مدينة بلبة وهي جنوبية عن مدينة انهلواره
بقريب من ثلثين جوزن فان اوله متاخر عن تاريخ شق بمائتي واحد واربعين
سنة ومستعملوه يضعون شككال وينقصون منه مجموع مكعب الستة و صرب
الخمس فبقى تاريخ بلب وخبره ات في موضعه واما كويت كال فكان كما قيل
قوما اشرارا اقوياء فلما انقضوا ارج بهم وكان اخيرهم فان اول تاريخهم ايضا
متاخر عن شككال ٢٩١

M. Reinaud's rendering is as follows:—

"Quant au Goupta kāla (ère des Gouptas), on entend par le mot *goupta* des gens qui, dit-on, étaient méchants et puissants; et l'ère qui porte leur nom est l'époque de leur extermination. Apparemment, Ballaba suivit immédiatement les Gouptas; car l'ère des Gouptas commence aussi l'an 241 de l'ère de Saca. * * D'après cela, en s'en tenant à l'an 400 de l'ère de Zedderdjed, on se trouve sous l'année 1488 de l'ère de Sri-Harscha, l'an 1088 de l'ère de Vikramaditya, l'an 953 de l'ère de Saca, l' 712 de l'ère de Ballaba et celle des Gouptas. * *

Déjà je me suis excusé sur l'imperfection de ce qui est dit ici, et j'ai averti que les résultats que je présente offraient quelque incertitude, vu les nombres qui excèdent celui de cent. Je ferai remarquer de plus que j'ai vu les Indiens, lorsqu'ils veulent marquer l'année de la prise de Soumenat (par Mahmoud le Ghaznévide), événement qui eut lieu l'an 416 de l'hégire (Janvier 1026 de J. C.), et l'an 947 de

Valabhi era commenced in 319 A. D. and that "the Gupta rule preceded it." [J. B. A. S. xii. 4.]

The amended translation contains these words "*and truly Ballaba was after them,*" [the Guptas]. What greater support does my argument require than the admission I have italicised? And yet, will it be credited?—on the strength of a sentence admitted to contain the substance of these words, it is unintentionally, but in effect—attempted to establish that the Guptas and the Valabhis were contemporaneous.

Major Cunningham next enters upon certain remarks about eras in general—designing to show that all eras necessarily begin with the rise and not with the fall of a race! and therefore that the era of the Guptas "commenced with the settlement of their own Dynasty." It is a pity, for the consistency of this view, that regard was not had to the era of Yesdegird, which might well have been brought to the writer's notice in the very pages of Al Birúní himself, or that, when speaking of Valabhi eras, it was not borne in mind, that the *first* Maharája of that race did not initiate the family cycle.* But to let this pass, in whatever era the Guptas may date their inscriptions, I should still claim to place the period embraced in all its integrity and completeness before A. D. 319.

Major Cunningham after assuming the employment of a *Special* Gupta Kál goes on to apply it in its details, by constructing a chro-

l'ère de Saca, je les ai vus écrire 242, puis au-dessous 606, puis encore au-dessous 99, enfin additionner le tout ensemble; ce qui donne l'ère de Saca. Ou peut induire de là que le nombre 242 indique les années qui précèdent l'époque où les Indiens commencèrent à se servir d'un cycle de cent, et que cet usage commença avec l'ère des Guptas. D'après cela, le nombre 606 indiquerait les samvatsaras de cent complets, ce qui porterait chaque samvatsara à 101. Quant au nombre 99, ce seraient les années qui se sont écoulées du samvatsara non encore révolu. C'est ce qui est en effet. J'ai trouvé la confirmation et l'éclaircissement de cela dans les tables astronomiques de Durlab le moultanien; ou y lit: E'cris 848 et ajoute le Loka-kâla, c'est-à-dire le comput du vulgaire; le produit manquera l'année de l'ère de Saca." En effet, si nous écrivons l'année de l'ère de Saca qui correspond à l'année actuelle, et qui est l'année 953, et que nous retranchions de ce nombre la quantité 848, il restera 105 pour le Loka-kâla, et l'année de la ruine de Soumenat tombera sur le nombre 98.

* Wathen, J. A. S. B. IV. 481.

nological list of the entire succession. In this he places *Srī Gupta* under Anno Gupta—thereby, in effect, making this individual the prominent founder of the Royal race of Guptas, a position scarcely in accord with the terms in which this person is spoken of in the family records on the Allahabad and Bhitāri columns,* or altogether in unison with the modest titles assumed by himself and his immediate successor.† The dynastic inscriptions concede but scant honor to these members of the race and only elevate Chandra Gupta 1st to the dignity of *Mahārājadhīrāja*.

I now approach the arguments mainly relied on, which are thus urged against me. "The direct evidence of the period when the Guptas flourished is derived from the Chinese. In A. D. 428, the king of Kapila, was named YUE-GAI or *moon-beloved* which is a synonyme of CHANDRA GUPTA, or *moon-cherished*."‡ I am disposed to

* The Rev. W. H. Mill in commenting on the Allahabad Column Inscription, expresses himself as follows. * * But the inscription gives us the names also of the prince and his immediate progenitors: and in accordance with the above-mentioned account, while we find his * * * ancestors, his grandfather and great-grandfather designated only by the honorific epithet *Mahārāja*, which would characterize their royal descent and rights—the king himself (SAMUDRA GUPTA) and his father are distinguished by the title of *Mahārāja Adhīrāja*, which indicates actual sovereignty. And the last mentioned circumstance might lead some to conjecture, that the restoration of royalty in the house began with the father named Chandra Gupta. J. A. S. B. III. p. 266 [see also Bhitāri Lāt Inscription, J. A. S., B. VI. p. 6, and Revised Allahabad Inscription, VI. 969.

† Prinsep, [J. A. S., B. V. 645], speaking of a coin of GHATOT KACHA, observes in regard to the style of legend adopted by these sovereigns; "to whom, whether from their extra-Indian, or their low origin, or their limited sway, the panegyrist seems to have avoided applying the usual epithets of royalty, *Mahārājadhīrāja*."

‡ "Para 3. The direct evidence of the period when the Guptas flourished is derived from the Chinese. In A. D. 428 the king of Kapila was named *Yue gai*, or 'moon-beloved,' which is a synonyme of *Chandra Gupta* or 'moon-cherished.' "

In A. D. 502, the king of India was named *Ku-to* that is *Gutto*, the Pāli form of the Sanskrit *Gupta*.

Lastly, Hwán-Thsang (*Fo-kue-ki*, Appendix) names five princes of Magadha, who flourished previous to the conquest of the country by Śīladitya, in the following order:—Lo-kia-lo a yi-to or *Lagraditya*, Fo-tho-kiu-to or *Buddha Gupta*, Tha-ka-ta-kiu-to or *Takta Gupta*, Pho-lo-a-yi-to or *Baladitya*, Fa-che-lo or *Vajra*.

attach no value whatever to this evidence. The statement referred to runs to the following effect—the kingdom of Kapila is mentioned by *Ma-twan-lin* under the name of *Ka pi li*.—In the article India,

4. Now Siladitya died between 642 and 648 (say in 645) and as he reigned sixty years, his accession must have taken place in A. D. 585; and his conquest of Magadha may be dated about A. D. 600. The chronology of the Guptas as derived from all sources will then stand thus. I. Gupta A. G. 0, A. D. 319. II. Ghatot Kacha A. G., 21, A. D. 340. III. Chandra Gupta 1st, A. G. 41, A. D. 360. IV. Samudra Gupta, *Parakrama*, A. G. 61, A. D. 380. V. Chandra Gupta 2nd, *Vikramaditya*, A. G., 81, A. D. 400. VI. Kumara Gupta, *Mahendra*, A. G. 111, A. D. 430. VII. Skanda Gupta, *Kramaditya*, A. G. 121, A. D. 440. VIII. Skanda Gupta, *Lagraditya* or *Lokaditya*, A. G. 133, A. D. 452.* IX. Buddha Gupta, A. G. 161, A. D. 480. X. Takta Gupta, A. G. 191, A. D. 510. XI. Nara Gupta, *Bajaditya*, A. G. 221, A. D. 540. XII. Vajra, A. G. 251, A. D. 570. Conquest of Siladitya, A. G. 281, A. D. 600. [Note.] (The dates obtained from various sources are:—for Chandra Gupta Vikramaditya, 82 (Udayagiri Inscription) and 93 (Sanchi Inscription), equivalent to A. D. 401 and 412—from Jain Authorities A. D. 409; and from Chinese Authorities A. D. 428—for Skanda Gupta—his death in 133, or A. D. 452 as stated on the Kuhsan Pillar;—for Buddha Gupta 165, or A. D. 484 as given by the Eran Pillar Inscription).

5. The chronological table has been framed upon the following data. 1st, The power of the Indo-Scythians did not begin to decline until the time of the later Hans in China, whose dynasty was only established in A. D. 222. During the latter half of the third century their power was on the decline, and may be supposed to have been finally overthrown by Gupta in A. D. 319. There are great numbers of gold coins of Indo-Scythian type with corrupt Greek and Indian legends which can only be attributed to this dynasty. 2d. A short inscription of Chandra Gupta, at Udayagiri, is dated in the year 82; and a second of the same prince, at Sanchi, is dated in the year 93. These dates of the Gupta era are equivalent to A. D. 401 and 412, which agree with the Chinese date of A. D. 428 for *Yue-gai* (Prinsep, Journal, VI. 665; Des Guignes I. 45, says A. D. 408). But Chandra Gupta on his coins takes the title of *Vikramaditya* and in the Agni Purana (Prinsep, IV. 688) it is said that *Vikrama*, the son of Gadharupa should ascend the throne of Malwa 753 years after the expiation of Chánakya. This event I have already placed in B. C. 325; from which deducting 753 years, we obtain A. D. 428 for the date of Vikrama of Malwa. Col. Tod also quotes a Jain inscription of Chandra Gupta, dated either in 370 or 409. (Trans. R. A. S. 140, 211) in which he is styled *Avantináth*, or “lord of Ujain,” which was the capital of Malwa. Here then we have a Vikrama and a Chandra Gupta both kings of Malwa at the same time: two statements which can only be recon-

he says: "In the 5th of the years *Yuan-kia*, in the reign of the Emperor *Wen ti* of the *Soung* (428 A. D.), *Yu ai*, king of *Kia pi li* in *Thian-chu*, sent an embassy to the Emperor * * under the Emperor *Ming-ti* of the same dynasty, the second of the years *Thai-chi* (A. D. 466,) *Kia pi li* again sent an ambassador to China bearing tribute. The *Ly-tai-ki-szu* also mentions an embassy from the king of *Kia pi li* in the year 428 of our era."*

The recognition of the existence of a kingdom of Kapila as one of any mark or prominence whatever at or about the periods indicated in the above—is singularly at variance with the facts supplied by both Fa Hian and Huen Tshang. The former in his itinerary speaks of the capital city in these terms. "In this town there are neither king nor people; it is literally a vast solitude.* This is the site of the ancient palace of the king *Pe-tsing*" [Śākya Muni's father] * * "The kingdom of *Kia'-wei-lo'-wei* [identified as Kapila] is a great solitude; the people are scattered, and white elephants and lions are to be apprehended on the roads."†

Two centuries later Huen Tshang reports the result of his observations to the following effect, "Ce royaume a quatre mille li de tour; on y compte dix villes désertes dont le sol est convert de

ciled by supposing them to be the same person under different names or titles, this supposition is confirmed by the coins of Chandra Gupta, on the reverses of which we find, that he took the titles of Vikrama and Vikramāditya. A cave Inscription at Udayagiri of the Samvat year 1093 or A. D. 1036 couples the name of Chandra Gupta with the kingdom of Vikramaditya (*Vikramaditya Rājyam*). In the *Raja Tarangini* also it is mentioned that Mātri Gupta was placed on the throne of Kashmir by Vikramaditya, king of Ujain.

According to my corrected chronology of the *Raja Tarangini*, this happened in A. D. 430. The *Satrunjaya Mahatmya* (Wilford, Res. As. Soc. IX. 156, and Wilson. *ibid.* XV. 39 note) also places the 3rd Vikramaditya in Samvat 466, or A. D. 409, From this accumulation of evidence it seems to me certain that a "Chandra Gupta with the title of Vikramaditya was the sovereign of Malwa in the early part of the 5th century of our era."—Bhilsa Topes, pp. 142 to 143.

* I extract this passage from Mr. Laidlay's translation of the *Foe Kone Ki*. I have not the original at command.

† Laidlay's translation, p. 189.

plantes incultes. La capitale est ruinée à un tel point qu'il est impossible de déterminer quelle était son étendue."*

It is absurd to suppose that this capital and kingdom could have been severally re-edified and re-peopled within so brief a space as intervened between the date of Fa Hian's visit, and the epoch alluded to by *Ma-twan-lin*, nor is it probable, if the kingdom had recovered itself to that point of importance in the scale of nations as the Chinese allusions to 428 A. D. and 466 A. D. respectively would imply, that it should have sunk back into such utter desolation in the second Pilgrim's time; on the contrary the tenor of the expressions made use of in the original *Sî-yu-ki* altogether forbids any idea of the kind.† It is far more reasonable to conclude that both the name of the prince, like that of the once flourishing monarchy, should be held to refer to an anterior period to that given by *Ma-touan-lin*, or perhaps with greater justice the whole affair may be put down as an empty and ignorant boast for the honor and glorification of the Chinese monarchs, made in connexion with a site so intimately associated with the early faith of Sákya Muni.

Next in order of Major Cunningham's direct evidences, comes the assertion that "in A. D. 502, the king of India was named *Keu-to* that is Gutto, the Páli form of the Sanskrit Gupta."‡ This statement, be it observed, is also derived from *Ma-twan-lin*, the author whose evidence I have just shewn such reason to distrust—but, under any circumstances, the information conveyed in this quotation is too vague and indistinct to merit much consideration—to make it of any real service in this discussion, it would be necessary to demonstrate, that the name of *Gupta* was special and exclusive with the GUPTA family; whereas the suffix in question was sufficiently common in the ordinary nomenclature of the cotemporary. If it had been proposed to assign the appellation to *Srî Gupta*, there

* Huen-Tshang "Julien," p. 126.

† *Sit-yu-ki* liv. VI. folio 7. "Comme ce pays est désert et inhabité depuis bien de siècles, 'on ne rencontre dans les villages que des rares habitants.' Il n'y a ni prince, ni chef suprême; dans chaque ville, on a établi un maître qui la gouverne." —Documents Géographiques, p. 394.

‡ J. A. S. B. VI. p. 65.

might have been more reason in the association ; except, that even Major Cunningham might perhaps be unprepared, either to assert that Sri Gupta was *king of India*, or to modernise his date to so late a period as 502 A. D. !

I now arrive at the crowning point of the Chinese evidence which is thus stated : “lastly Huen Thsang names five princes of Magadha, who flourished previous to the conquest of the country by Siladitya in the following order *Lagraditya, Buddha Gupta, Takta Gupta, Baladitya, Vajra.*” Major Cunningham then proceeds to tack on this list of princes to an imaginary *second* Skanda Gupta, and to argue, that Siladitya, in or about A. D. 600, conquered and superseded the last of these five monarchs : what justification the original text of *The-koue-ki* may have afforded, for placing these kings *immediately* prior to Siladitya, I have no means, at this moment, of ascertaining, but, that it has proved a most infelicitous experiment, the now published translation of Huen Thsang’s travels too clearly manifests ! So far from the author in question giving any authority for these five monarchs being located in the second half of the 6th century, he absolutely assigns them to a period shortly succeeding the *Nirvana* of Buddha or at about 700 years prior to the date at which he himself visited India ! I transcribe this passage entire in order that there may remain no possible doubt of the justice of my somewhat startling rectification !

“Après le *Nirvâna* du *Buddha*, un ancien roi de ce royaume, nommé Cho-kia-lo-o-tie-to (*Çakraditya*), rempli de respect et d’amour pour le *Bouddha*, construisit à ses frais ce Kia-lan (*Sāṃghārāma*).

“Ce roi étant mort, eut pour successeur son fils Fo-to-k’io-to (*Buddhagoupta*), qui, après avoir pris les rênes de ce grand royaume, construisit plus loin, au sud, un autre Kia-lan.

“Un peu plus loin à l’est, son fils, le roi Ta-t’a-kie-to (*Tathāgata*), bâtit un autre couvent.

“Plus loin au nord-est, son fils Polo’ot’ieto (*Bālāditya*) bâtit un autre couvent.

“Dans la suite, voyant qu’un saint religieux venait de la Chine, et se dirigeait vers lui pour recevoir de ses mains les provisions nécessaires, il fut transporté de joie, quitta son trône et embrassa la vie religieuse.

" Il eut pour successeur son fils Fa-che-lo (*Vadja*), qui, plus loin au nord, construisit un autre couvent.

" Quelque temps après, un roi de l' Inde centrale bâtit à côté un autre couvent.

" De cette manière, six rois, qui montèrent successivement sur le trône, se livrèrent chacun à de pieuses constructions. Le dernier de ces rois entoura tous ces couvents d'une enceinte de murs en briques et les réunit en un seul. pp. 149, 150 * *

* * * Dans le séjour de tous ces hommes vertueux, régnaient naturellement des habitudes graves et sévères ; aussi, depuis sept cents ans que ce couvent existe, nul homme n'a jamais enfreint les règles de la discipline."—p. 152. •

Having now shewn how baseless Major Cunningham's whole fabric is, I need scarcely occupy myself with the adventitious supports with which he designs to give it strength ; but it may be instructive to examine his reasoning on these lesser matters, in order that the public may still further judge of the soundness of the conclusions of an antiquarian guide it might otherwise be disposed to rely upon.

First in order of these subordinate aids is placed certain vague information contributed by *Ma-twan-lin*, regarding the power of the Indo-Scythians having survived in India till A. D. 222—even supposing our authority to be trustworthy in the general assertion, we require a much more specific exposition of the geographical limits to be assigned to the Chinese idea of "*India*,"—we have already seen it used somewhat loosely by this same author, and it is quite in accord with probability that successors of Scythians may have continued to reign in various outlying kingdoms of India or even in isolated portions of India Proper until long after the 3rd century A. D. ; I freely adverted to these points in my previous essay, and moreover quoted a curious passage from M. Pauthier, which if borne out—would materially shake all hitherto-received opinions as to the connexion between the Guptas and the Indo-Scythians.

I remarked—"It is clear that in some divisions of Northern India, the Tochari, or Yuë-Chi, continued to furnish Scythic opponents for the occasional display of heroism on the part of the indigenous monarchs until at least the early portion of the 3rd century

of our era.* The complete decay of the Indo-Scythic empire, whether due on the one hand to successive losses of frontier provinces, or to the less perceptible fusion† of the races of conquerors and conquered on the other, was manifestly a work of time, and apparent traces of the surviving power of the race were to be detected west of the Indus so late as the end of the 4th century."

But, for reasons already stated—I by no means concur in the supposition that "they were finally overthrown by Gupta," either in A. D. 319 or that at any time this monarch made any great progress against them. The coins of the dynasty in this respect, bear out the general tendency of the inscriptions—and would lead us to conclude that the more important acquisitions of territory were not made by the Gupta family until the reign of Chandra Gupta 1st, or more decisively under the rule of Samudra Gupta—Ghatot Kācha, though he imitates Scythian devices in his mintages,‡ does not directly adopt their more special type, with the Parvati APΔOKPO

* Note upon Ma-twan-lin, J. A. S. B., vi. 63, also Pauthier, "Thian-tchu," extract from the Journal Asiatique, 1839, note, p. 9.

† M. Pauthier (Thian-tchu, Journal Asiatique, 1839) notices a curious enquiry, suggested by the similarity of meaning existing between the words Youë chi and Chandra Vansa: subjoined are M. Pauthier's translation of the Chinese text and his own notes on this head:—

"Dans la Relation des contrées occidentales (*Si-yu*), le royaume du *Thian-tchu* est nommé par quelques-uns *Chin-thou*; et on le dit situé au sud-est des Youë-chi* ou 'peuple de race lunaire' à la distance de quelque milliers de *li*. Les mœurs de ses habitants sont les mêmes qui celles des Youë-chi."† Page 7.

* "Youë-chi, mots ethniques qui signifient *de race lunaire*, absolument comme le terme Sanskrit चन्द्र वंश *ichandra vansa*. Voy. la notice sur ce peuple célèbre (que l'on croit être les Indo-Scythes des historiens occidentaux), que nous avons traduite du Pian-i-tian, liv. LII. art. 2."

† "*Sou yu youë-chi-thoung*: mores cum (*roû*) Youë-chi (*moribus*) idem. Quelque extraordinaire que cette assertion paraisse, elle confirmerait le soupçon que nous avons déjà émis ailleurs, que les Youë Chi ou hommes de race lunaire pourraient bien avoir la même origine que les rois Indiens, aussi de race lunaire, Tchandra-vansa."

May not these coincidences, conjoined to the curious verbal similarity to be detected between NANAIA and NANO, suggest the possibility of the meaning of the latter referring to the moon, and thus PAO NANO PAO being, the King, the Lunar King, or King of the Lunar Race?

‡ J. A. S. B. Vol. V. pl. xxxvi. fig. 12. *Ariana Antiqua*, pl. xviii. 14.

Reverse,* which, as far as we at present are able to decide, seems to have been first appropriated by Samudra Gupta. The more extended conquests of the house of Gupta do not indeed appear to have been consolidated till the time of Skanda Gupta himself—when the dynastic power may be supposed to have reached its zenith† and thereafter to have suffered decline. We have no immediate means of determining whether Mahendra Gupta‡ was directly succeeded by Buddha Gupta, but it is clear, that under the latter, the extent of the empire had become sensibly diminished.§

Of the miscellaneous items assembled under the second heading in support of the proposed chronological table, I may pass by the inscription dates. I do not contest the term of years indicated by each but seek to discover the era to which the given numbers apply; hence as these figures can in no wise aid in the solution of the difficulty, they scarcely demand further notice in this place. **

I now come to the argument wherein it is sought to prove that Chandra Gupta the II. of our list, is identical with *the* Vikramaditya of Malwa of the early part of the 5th century. I can afford to give Major Cunningham a Chandra Gupta and a Vikramaditya for any

* See J. A. S. B. iv. pl. xxxviii. figs. 16 and 17; pl. xxxix. fig. 19; Vol. V. pl. xxxvi. fig. 14, &c. Ariana Antiqua, pl. xviii. figs. 6, 7, 8, 9 and 10.

† J. A. S. B. vii. 37 and 348.

‡ As Major Cunningham has taken some liberties with the Gupta succession, I append, for facility of reference, Professor Mill's authoritative list, as given J. A. S. B. vi. 8.

1. Gupta or Srí Gupta (Mahárāja).
2. Ghatot Kacha.
3. Chandra Gupta I. (Mahárájadhirāja).
4. Samudra Gupta.
5. Chandra Gupta. II.
6. Kumára Gupta.
7. Skanda Gupta.

8. Mahendra Gupta—noticed as a minor in the Bhitári Lát inscription, the name is contributed by coins.

The Erun pillar furnishes us with the name of a 9th prince of this house—*Buddha Gupta*, but the order of his accession is undetermined. See J. A. S. vii. 634.

§ Bhim Sén's pillar at Erun and inscription on temple at Erun.

period of Indian history that he may desire, subsequent to the date of the prominent individuals who made both name and title common in the land, but I am not prepared to concede that sufficient cause has been shown either to authorize Chandra Gupta II. being brought down to the 5th century—or to justify his being converted into a special Vikramaditya. The former point has been already sufficiently discussed, the latter calls for further remark. In the first place I must observe, that in the whole series of the Gupta inscriptions, in which the name of Chandra Gupta II. occurs—in no one instance is that name associated with any such title as Vikramaditya.*

Indeed, in the Sanchi inscription, he is expressly mentioned as being “known among his subjects” by another designation, that “of *Deva rāja*!”†

These very significant facts may have escaped Major Cunningham’s notice, but to indicate—apart from these, how much of special pleading is involved in his argument on this head—I may note, that he relies mainly, for his proof of the *exclusive* right of Chandra Gupta to the honorific title of Vikramaditya—on the occurrence of the words *Sri Vikrama*, &c. on the reverses of some of his coins—altogether ignoring the rather damaging incident, that the full title of Vikramaditya is found also upon the coins of Skanda Gupta.‡

After the concession I have offered above, it will be useless for me to follow the attempted identification, as tested either by the pretended prophecies of the Puranas, by Tod’s very dubious inscription, by the contributions of Jain authorities, or by the shadowy indications afforded by the Rāja Tarangini.

In regard to Major Cunningham’s third point,§ i. e. the notice on the Kuhaon pillar of Skanda Gupta’s death—this simply proves

* Bhitāri Lāt, p. 4, J. A. S. B. vi.; Udayagiri Inscription Bhilsa Topes, p. 151.

† J. A. S. B. vi. p. 456.

‡ J. A. S. B. v. pl. xxxvi. fig. 17; Jour. Roy. As. Soc. xii. pl. iii.

§ “3rd. The date of Skanda Gupta’s death, which is found on the Kuhaon pillar, is the year 133. No era is stated; but it must of course be that era which was used by the ‘royal race of Guptas,’ of which he is said to have been born; and which could only have been the *Gupta kāl*, or Gupta era.

His death therefore occurred in $319 + 133 = 452$ A. D. as given in my Table. p. 144.”—Bhilsa Topes, p. 144.

nothing : as I said before, the annual dates need not be contested, it is the cycle to which they belong that continues to be the enigma. But here again the advocate for the modernization of the Guptas seems to have committed himself, inasmuch as he is found assuming Skanda Gupta's death to have taken place in 133 of the year of his dynasty—while the original, from which he quotes, is given by Prinsep as “in the year one hundred and thirty-three *after the decease* of Skanda Gupta!*

The fourth† item of data for the chronological table—the Erun pillar record of 165 is merely as valuable as the third!—Buddha Gupta may, in that year of a particular epoch—have erected the commemorative stone, but this in the absence of other evidence no more supports Major Cunningham's position that 165 is equal to A. D. 484, than any other given number would have done.

I am glad to find that there is one point‡ in which Major Cun-

* I do not wish for a moment to conceal the fact that Prinsep's translation of the passage in question is hardly satisfactory ; he himself distrusted it—and if Major Cunningham had made any such observation, I should have concluded that he had obtained a new and improved transcript and translation, but it is probable that if he had done so he would possibly have discovered that the real date is 141 and not 133.

† “ 4th. The date of Buddha Gupta has been determined by the inscription at Erun, which records the erection of a pillar in the year 165 or A. D. 484. An inspection of the table will show how well this date agrees with the period which must be assigned to Buddha Gupta on the authority of Hwan Thsang ; according to whom *Fo-thoku-to* or *Buddha Gupta* was the fourth prince prior to Siladitya's conquest of Magadha in A. D. 600. The coins of Buddha Gupta may be seen in pl. ii. figs. 55 and 57, of Mr. Thomas's Essay on the Sah kings of Surashtra, and I can confirm the reading of the legend, which he gives with some hesitation as Buddha Gupta—I procured five of these silver coins from a traveller at Benares, of which I have given away four ; but I still possess sealing-wax impressions of them all, from which I have been able to recognise the engraved specimens.”—Bhilsa Tepes, p. 144.

‡ “ 5th. The coins of NARA GUPTA *Báladitya*, are scarce. Of two specimens in gold, that have been in my own possession, I have still impressions ; but the type may be seen in fig. 22, pl. xviii. of Wilson's ‘ *Ariana Antiqua*.’ On the obverse under the Rája's arm is written *Nára* and on the reverse *Báladitya*. The small silver coin fig. 19, pl. xv. of the same work, most probably also belongs to *Nára*. I read the legend :—

ningham is able to support me, that is in the reading of the silver coins of Buddha Gupta.* I could have wished to have been able to compliment him equally on the success of his transcription of the legend of the silver piece, depicted in *Ariana Antiqua*, pl. xv. fig. 19—which he proposes to assign to Nāra Gupta Bāladitya; now, as this monarch has proved, as far as the Gupta dynasty are concerned, to be a very ancient myth, I need not seriously contest the point, but I may remark, that I think Major Cunningham would have been wise to have left my reading† of that coin unassailed—I had had the piece under my eye, had transcribed from the original each letter and fragment of a letter—moreover, at the moment of this examination I had before me five other specimens of coins with identical legends, and I then deciphered, as I even now can confirm from my Note-book—the following letters:—

परम भ रज श्रीस्कन्दगुप्त क्रमदित्य

The seven first letters are indubitable, the name of Skanda Gupta is damaged, but quite enough remains of the first and second compound consonants to render their recognition thoroughly satisfactory. The two double letters of the word *Gupta* were only represented by the subjoined त्; but, as Major Cunningham also finds Gupta on the coin, I conclude he will not deny me this. The two opening letters of Kramaditya are almost obliterated, but, there can be little doubt about the entire word, which other identical specimens supply in full legibility.‡ The only real difficulties in the conclusive decipherment of the coin were fairly stated by me at the time, to the following effect—"These legends are often imperfect, and very constantly of unequal length, resulting apparently from the amount of room the die-sinker happened to find himself possessed of, as he proceeded with his engraving. Thus in one coin (Wilson A. Art, pl. xv. fig. 19,) the second word [भगवत्] appears to have been contracted into its initial letter, and the three letters

Paramadhi Rāja Śrī Nāra Gupta, Bāladitya.

[This seems to conclude all that Major Cunningham has to say on the subject of the Guptas, the subsequent extracts do not form *continuous* portions of his text.]

* J. R. A. S. B. XII. 70.

† J. R. A. S. B. XII. 66.

‡ A. A. XV. 16; J. A. S. B. XII. pl. ii. 45 and 46.

that should have succeeded are replaced by two letters serving to express the word *राज*." Had I not shewn, in entering into all this detail, that I had fairly examined the *original* piece, there might have been more excuse for Major Cunningham's venturing to correct me on the strength of a mere engraving; which, however well executed—as it certainly is—in its main devices, must necessarily have been expected to prove somewhat imperfect in the expression of the fragmentary letters of a legend, the alphabet of which was unknown to the artist.

I need scarcely advert to the attribution claimed for the gold coin No. 22, pl. xviii. *Ariana Antiqua*.

As I do not, at this moment, propose to do more than notice the Gupta portion of the question as it stands between myself and Major Cunningham, I shall reserve, for a future opportunity, my reply to his proposed rectification of the earlier or Sâh epoch; but, there are two points noticed in the Bhilsa Topes as apropos to that period which may properly be disposed of in this place.

The Gupta inscription on the Allahabad column, in enumerating the conquered and tributary states of Samudra Gupta makes mention of "precious metals brought as tribute by the heaven-descended monarch, the *Shâhân Shâhi*, the Scythians, the Huns, &c."* Upon this Major Cunningham proceeds to argue,† that if the Guptas are to date, as Al Birûnî would make them, that this reference of Samudra Gupta must be taken to allude to the "Sassanians!" I think the author would have done well to have followed Prinsep in this matter, and to have confined himself to the inference that in this "we have a limit to the *modernicity* of our inscription," as suggested by that most excellent archæologist, but I am prepared to contend, that the title of *Shâhân Shâh* is not *peculiar* to the Sassanians, and that if

* J. A. S. B. VI. 979.

† Major Cunningham's words are—"Samudra Gupta according to the Allahabad and Bhitâri inscriptions was the fourth prince of the Gupta dynasty; and if we allow twenty years to each reign, Samudra will date from 60 to 80 of the Gupta era, or from 138 to 158 A. D., but in the Allahabad pillar inscription Samudra mentions the *Shâhân Shâh* (that is one of the Sassanian kings of Persia) as his contemporary, whose dynasty did not attain the throne until A. D. 223," * * * page 147.

any thing (apart from the present issue) it is more appropriate to the Mulúk-i-Towaif, whose head was essentially a king of kings,—the constitution of the Parthian system of government was, that there were “kings in each city,”* and one Suzerain over the whole: who entitled himself ΣΑΤΡΑΠΗΣ ΤΩΝ ΣΑΤΡΑΠΙΝ Satrap of Satraps,† ΒΑΣΙΛΕΩΣ ΒΑΣΙΛΕΩΝ,‡ or the Semitic מלכין מלכא Malkín Malká,§ as the case might be. The Sassanians imitatively adopted the latter title, without however, continuing the political constitution, which had rendered the designation so peculiarly appropriate. From *Malkán Malká*, the later members of the Sassanian dynasty proceeded to خدا Khuda,|| the then current term for King—but neither Sháh nor Sháhán Sháh is ever found on their coins, though that the term existed, we have of course evidence in the name of

* ‘Abari, Persian MS. همه بدست ملوك طوايف بود و هر شهري را بادشاهي بود.

† Gotarges’ Greek inscription at Behistun, quoted by Rawlinson, J. R. A. S. XI. 118.

‡ Coins, J. A. S. B. II. p. 34, &c.

The following early Parthian Monarchs adopt the title of ΒΑΣΙΛΕΩΣ ΒΑΣΙΛΕΩΝ on their coins!

- 1st. Arsaces, VI. Mithridates I. 173 to 136 B.C.
- 2nd. Ditto, XII. Phrahates III. 70 to 60 B.C.
- 3rd. Ditto, XIII. Mithridates III. 60 to 54 B.C.
- 4th. Ditto, XIV. Orodes I. 54 to 37 B.C.
- 5th. Ditto, XV. Phrahates IV. 37 B.C. to 4 A.D.
- 6th. Ditto, XIX. Artabanus III. 13 to 42 A.D.

The first and second Kings of this list continue however to employ the simple ΒΑΣΙΛΕΩΣ Arsaces XII. likewise styles himself ΒΑΣΙΛΕΤΟΝΤΟΣ ΒΑΣΙΛΕΩΝ. *Ruler of Kings.*

The three Princes noted below take the title of ΘΕΟΠΑΤΟΡΟΣ

- 1st. Arsaces, IV. Phraapatus 196 to 181 B.C.
- 2nd. Ditto, VII. Phrahates II. 136 to 126 B.C.
- 3rd. Ditto, IX. Mithridates II. 123 to 87 B.C.

“View of the coinage of the Parthians,” by John Lindsay, *Cork*, 1852.

§ Coins Num. Chron. XII. 68.

|| See Longperier “Essai sur les Medailles des Rois Perses” coin 47, page 52, coin 48, &c. See also Hamzah Isfaháni, p. 47, خدا كشان Regis interfectores Journal Asiatique 1841, pp. 145, 278, خدا نامه Livre des rois et Kūdāi boum le maître de la terre!

Shahpuhuri (شاهپوری) * and the word is likewise found upon gems, in a position that clearly indicates its *kingly* meaning.†

It is possible that the term had somewhat of a local currency in Kermán, Seistán, &c. as distinguished from the Semitic *Malká*. I must add, however, that the Indo-Sassanian coins still retain the *Malká* in their Pehlavi legends, though the Sanskrit *वर्षि* or *वर्षि* *Sháhi*‡ is also found, in various shades of alphabetical development, on some types of this mixed coinage.§

The only other point I have now to advert to, also very closely concerns the Guptas. Major Cunningham remarks:—"The alphabetical characters of the Saurashtra coins are so widely different from those of the pillar and rock inscriptions, and at the same

* Inscriptions at Nakshi Rustam, and Kermán Sháh. De Sacy and Journal Asiatique, XI. 653.

† Ouseley Medals and Gems (Lon. 1801) J. R. A. S. XIII. 418. J. A. S. B. III. Pl. XXI. 10 and 11. Pl. XXV. 6. A. A. XXI. 22, XXVII. 9.

‡ Had Major Cunningham been better up in his subject, he would have found a tempting argument, in the *Daiva putra Sháhi*, of the Allahabad inscription; which Prinsep erroneously supposed to refer to the Parthians on the strength of the term ΕΚΓΕΝΟΤΕ ΘΕΩΝ, as found in the triple inscriptions at Naksh-i-Rustam (De Sacy Mémoires sur Div. Ant. de la Perse, p. 62, Ker Porter 548); but, Prinsep might have seen from the text itself, that these terms are applied to the Sassanian monarchs *Bábek*, *Ardeshir* and *Sapor*, and have no reference whatever to the *Ardevan*—the last of the Arsacidæ—whose prostrate figure appears in the sculptured group the inscription serves to illustrate. I am not however in a position at this moment, to determine how much of this assumption of godlike descent, by the early Sassanians, may have been derived from their predecessors' style of imperial glorification.

But all discussion on this head is rendered illusory, in the fact, that Prinsep himself confesses, that "the two first letters [देव] are slightly obliterated, and might be read either *Dábha* or *Dára-putra*. To judge, however, from the author's own facsimile the second letter is far more like a *भ Bh*, than a *व V*; indeed, it differs materially in form from other well ascertained V's in the same line. Nor do I think the proposal to read the second letter as *र R*, one whit more admissible. As for his diphthong, it seems, from his own alphabet, attached to the place that this can only be rendered as the vowel o—making the word *दोभ*, *Dobha*. J. A. S. B. VI. p. 974.

§ A. S. B. VI. 18, XVII. 11, XXI. 20; J. A. S. B. V. pl. iii. 3; J. R. A. S. XII. p. 1.

time are so much similar to those of the Guptas, that it is impossible not to conclude, that there must have been a long interval between Asoka and the independent Sáh kings and an almost immediate succession of the Sáh kings by the Guptas.”*

In reply to this, I have only to re-quote in this place, my original authority for an inference to a different effect, leaving my readers to elect the author of the Bhilsa Topes to a higher position as a palæographer than JAS. PRINSEP, if they so will it. The following extracts from the J. A. S. B. were printed in my paper on the Sáh kings.† “The character [of the Sáh inscription] is only one remove from the Buddhist alphabet of *Girvár*.”‡ * * * “The *Sanskrit* character of the third century B. C. differs only so much from the original form [the Buddhist alphabet of the 5th century B. C.] as the habits of a class of writers distinct in religion and more refined in language, might naturally introduce.”§

Prinsep goes on to say “The ASOKA alphabet|| (the Sanskrit one) agrees very closely with that of our *Saurashtra* coins, which may thence be pronounced to be anterior to the Gupta series. The *Gujerat* plates dated in the third century of the Samvat era [?], differ but little from the *Allahabad* pillar or *Samudra-Gupta* inscription, but that little is all in favour of their superior antiquity.”¶

I conclude that Major Cunningham does not wish to date the Sáh coins at any later epoch than the Sáh inscription, as he must be

* P. 148.

† J. R. A. S. XII. 24.

‡ J. A. S. B. VII. 337.

§ J. A. S. B. V. 275. Prinsep, J. A. S. B. VII. 275. The words are as follows: the Sanskrit character of the 3rd century B. C. &c. differs only so much “from the original form as the habits of a class of writers distinct in religion and more refined in language might naturally introduce.”

Major Cunningham himself undesignedly concedes much towards this argument in the fact he notices of “the extremely rare use of compound letters” in the Buddhist legends engraved on the Bhilsa Topes. He remarks “only three instances occur throughout all these inscriptions; and they are certainly exceptions to the common practice of Asoka’s age, which adhered to the simplest Páli forms.” B. F. 268.

|| It may be necessary to remind my readers that Asoka’s name occurs in the Sáh inscription—this is the sole instance of its use in inscriptions. In his own edicts he calls himself *Devánampya Piyadasi*, J. A. S. B. VII. 219 et seq.

¶ Ibid, 276.

well aware how much the Numismatic characters of one and the same alphabet are liable to differ from their lapidary equivalents ! So, I will simplify the question by confining myself to the style of writing used upon rocks, stone pillars and copper-plates.

Major Cunningham seems disposed to admit of but one single element, as liable to affect the march of alphabetical development—that of time—but to show how fallacious any notion of a *necessarily* progressive change would be, I may call attention to the very slight modification, that is seen to have taken place in the local alphabets of Guzerat, &c. during ten or eleven centuries—and I would enquire, if his argument is to hold good, how much of difference ought we to be able to detect between the alphabet of the Vallabhi copper-plates, which he would date in the 6th century A. D. and the style of writing in use in the Western Caves, which is almost identical with the characters of the Buddhists of the 5th century B. C. And yet, a reference to Prinsep's facsimiles* will show how essentially limited the alterations effected by this lapse of ages really were ! Jas. Prinsep, as we have seen, was prepared—with his usual frankness—to concede that there were other causes likely to influence these alphabetical mutations—though his original idea had clearly been to assign all impulse in this direction to the effect of time. Had he lived to perfect his theory, I doubt not, that he would have accepted other agencies as playing an important part in the results to be accounted for ; prominent among these would, I think, have to be placed the advance or retardation due to nationality or other *local* influences ; otherwise it would be difficult indeed to account for the various separate alphabets that we find in all their independent diversity at a later period of Indian progress.†

* J. A. S. B. VII. pl. xiii.

† As my readers may be glad to learn what Al-Birûnî says on the state of the varieties of writing current in his day. I append the passage entire.

"On compte plusieurs écritures dans l'Inde. La plus répandue est celle qui porte le nom de *siddha-matraca* (سد ماترك) ou substance parfaite ; elle est usitée dans le Cachemire et à Benarès, qui sont maintenant les deux principaux foyers scientifiques du pays. On se sert également de cette écriture dans le Madhya-Deça, appelé aussi du nom d'Aryavartta. Dans le Malva, on fait usage d'une écriture appelée *nakka* (ناک): celle-ci est disposée de la même manière que la première ; mais les formes en sont différentes. Une troisième écriture, nommée

Prinsep's own impression, above quoted, will display how little reliance could be placed on a judgment, which did not take this element into consideration, for he assigns, on the mere ground of forms of letters, a higher antiquity to the Guzrat copper-plates, than he does to the Gupta inscriptions; whereas, we now know, that the Guptas preceded the Vallabhis!

Had he confined himself to tracing the alphabetical advances made by these different sections of Indian races, instead of comparing two series of literal signs that had been thus far matured by different hands, he would have worked upon surer ground. To support my assertion, I would beg attention to the varieties of types of letters to be found on the nearly contemporaneous Gupta inscriptions. If we examine the Allahabad writing* and contrast it with that on the Bhitari lât,† we discover considerable difference between the general configurations of the majority of the characters in each—varying from scarcely perceptible modifications, to an absolute difference of form in others; for instance, the ख, ग, घ, ण and ऋ are virtually the same characters in both inscriptions, but their outlines are by no means identical, while the signs ए, अ, इ and उ are, so to speak, different letters. To carry out the contrast, let us refer to the Bhilsa‡ inscription. Here again we find a general change in the aspect of the letters and most distinct modification or absolute divergence from the Allahabad type in the following characters—अ, इ, ए, घ, ण, अ, ग, र, ऋ, ष and उ. I need not, I imagine, pursue

arddha-nagary (اردن کوری), c'est-à-dire à moitié nagari, et qui participe des deux premières, est usitée dans le Bhatia (بهاتیة) et dans une partie du Sind. Parmi les autres écritures, on peut citer le malcâry (ملقاری), usité dans Malcascheva (ملقشوا), au midi du Sind, près de la côte; le besandiba (بسندب), employé à Bahmanava, ville appelée aussi Mansoura; le karnâta (کرنات), usité dans le Karnate, pays qui donne naissance aux personnes appelée, dans les armées, du nom de Kannara (کنرة); l'andri, employé dans l'Andra-Deça ou pays d'Andra (اندر دیش); le dravidi, usité dans le Dravida ou Dravira; le lan- dans le Lar-Deça ou pays de Lar; le gaura (کوری), dans le Purab-Deça (پورب دیش) ou région orientale (le Bengale); et le bikchaka (بیکشک) dans le O'-an-Pourahana (اودنپورھناک). La dernière écriture est celle dont se servent les bouddhistes (البُد).” *M. Rienaud*, Mémoire sur l' Inde p. 298.

* J. A. S. B. VI. 969.

† VI. 1.

‡ VI. 455.

this dry subject in greater detail ; but, I have some further observations, that I am desirous of offering on the general topic of the early status of Indian systems of writing.

Prinsep has himself suggested the enquiry as to how much of change of alphabetical symbols might be incident upon the use of a more perfect language, as compared with the requirements of the local Páli. Another point of important bearing on the main question, is the probable modification the written or cursive literal signs were subjected to as opposed to the stiff and formal outlines of the characters of the rock inscriptions ?

Up to this time, it has been usual to consider the old Páli writing as the basis of all Sanskrit alphabets, we need not contest this inference, but we may fairly enquire, if we have reached the date of the first use of that character, in the epoch assigned to the early Buddhist inscriptions ? the reply would reasonably be in the negative ! This system of writing, in its sufficiency for all purposes of its own proper linguistic expression, may well have continued for a lengthened period unchanged, as far as inscriptions were concerned, at the same time, that there may have been a progressive advance in the cursive hand, of which we have no immediate record.

We have evidence, in sufficient abundance, to prove that the Eastern nations often availed themselves of a cursive hand, in common with the more formal character reserved for inscriptions. These would each be naturally affected, in the ultimate determination of forms—by the material which had to receive the writing.

Thus the straight wedge-shaped elements of the cuneiform alphabet* were singularly well fitted for easy expression on tablets of Babylonian Clay, and equally suited to rock inscriptions, while the written hand executed only on a smooth surface, presented no difficulties to any series of curves or complicated lines. In addition to leathert† and other materials, the ancient Persians, we also learn wrote upon *Thús*‡ (Birch-bark). The Indians we know adapted this

* Layard " Discoveries," &c. 346 and 601, &c. J. B. A. S. XVI. 215.

† Assyria, P. H. Gosse, London, 1832, p. 546.

‡ Hamza كتاب تاريخ الامم, p. 961 and xxv. " Libri inventi sunt, in quibus sitæ erant variae eorum disciplinae, omnes lingua Persica antiqua scripti in tûz." See also Ayin i Akberi, II. 125.

substance to the same uses,* and possibly the Indian Vedas are indebted for their preservation to this very material; whether its employment was limited to the population whose dialects were expressed in the Arian character we have no means of saying, but in all probability, if the Northern Indian races knew of its use, the Magadhis would not have remained long deprived of it or some suitable substitute; that they also wrote with *ink* is amply established by the discovery of letters so written on the relic caskets at Sanchi.†

I imagine it must be conceded, whether on the indications afforded by inscriptions, coins or Buddhist relics, that the ancient Pāli or *Magadhi* alphabet had once a very extended currency, and likewise that for a lengthened period it retained its separate identity. It occurs in Asoka's edicts at Delhi,‡ Allahabad, Matia, Bakra, Dhauri and Girnār, its appearance in these several localities§ would, *prima facie*, imply, either that it was intelligible to the people at large throughout the circle embraced within these geographical boundaries, or that it was the recognised sacred alphabet of Buddhism: opposed entirely to the latter supposition is the departure from its use, in the Kapurdigiri text of *the* edict itself, and the modification the language is seen to have been subjected to in some of the *Pāli*

* Masson in A. A. p. 60 and 84. See also fig. 11, pl. iii. Ibid. Masson continues his remarks on substances used to receive writing: "In one or two instances I have met with inscriptions; one scratched with a stylet or sharp-pointed implement around a steatite vase extracted from a Tope at Darunta; another written in ink around an earthen vessel found in a Tope at Hidda; and a third dotted on a brass vessel." See also Reinaud Memo. sur l' Inde, p. 305.

† J. R. A. S. XIII. 110. Bhilsa Topes, 299.

‡ Of the two stone pillars at Delhi, one was moved down from near Khizrabād, at the foot of the Himalayas—the other was taken from Mirat—Jour. Arch. Soc. Delhi, 70, 1850.

§ Other inscriptions in this character occur at—

1. *Sanchi*—J. A. S. B. VI. pl. xxvii. page 461 and VII. pl. lxxii. 562.
2. *Gya*—Caves, ditto VI. pl. xxxv. Nos. 2 and 3, page 676, these are of the epoch of Dasaratha who followed Suyasa the immediate successor of Asoka!
3. *Cuttack*—Udayagiri Caves, J. A. S. B. VI. pl. liv. p. 1072.
4. *Ibid*—Khandagiri Rock, J. A. S. B. VI. pl. lviii. p. 1080. About the same time we now add a but slightly modified form of writing as discovered in the Melā inscription in Ceylon. J. R. A. S. XIII. 175.

transcripts to meet apparently the local dialects of each site.* On coins, it can scarcely be thought to hold any religious signification, but, the available medallion testimony contributes largely to the inference, that these characters formed the ordinary medium of record in the majority of the states included within the limits above adverted to. In this alphabet exclusively are expressed the legends of numerous series of coins of purely local type,† its characters are found associated on the one part with the Greek of Agathocles and Pantaleon‡ and its phonetic signs are conjoined with counterpart Arian legends on certain classes of the *Behat* coins.§ The Buddhist relics do little towards elucidating the expansive spread of this style of writing,|| but—if rightly interpreted—they illustrate in a striking manner the antiquity of its ordinary employment in its even then fixed form.

Another point of view from which this Palæographic enquiry has to be regarded, is the influence exercised by the conterminous alphabet of Semitic origin—that equally served to express modified forms of the same speech.* This character—also claiming the highest antiquity—existed as indigenous South of the Hindú Kush¶ and extended over the Southern base of the Himalaya as far as the Doáb of the Jumna and Ganges. This style of writing, though defective in its Semitic organization, would seem to have found full favour in its day and to have been very extensively employed, as is proved by its extant remains in inscriptions,* on coins, strips of copper, rotic cylinders, &c.†

Its currency in India proper is shewn in the legends discovered

* Prinsep towards the conclusion of his review of the various lāt inscriptions observes, "The vernacular language of India at that period, then, varied in different provinces:—it approached more to the Sanskrit in the North-west; diverged from it in *Magadha* and *Kalinga*:—but it was in both places essentially what is now called *Prākrit*. * * There is no trace of genuine *prākrit* in either of the dialects." Vol. I. p. 280.

† J. A. S. B. IV. pl. x. and xxxv. and VII. pl. lx. and lxi.

* J. A. S. B. V. pl. xxxv. 8 and 9; A. A. VI. 7, 8, 9 and 11.

§ J. A. S. B. VII. pl. xxxii.

|| J. E. A. S. XIII. p. 108. "Bhilsa Topes," p. 299, &c.

¶ A. A. S. 243. * J. R. A. S. XII. p. 153.

† A. A. pl. ii.

in the Tope at Manikyala,* its uniform appearance on the money of the Greek and Scythian dynasties of the Punjab, and its limit Eastward is established by the bilingual Buddhist coins of Behat,† and, if the attribution may be held to stand, by the satrap coins of Hustinapore on the Ganges.‡

Major Cunningham, I understand, proposes to assign these bilingual Behat coins of Kunanda to the period of the nine Nandas: § if this be correct, the Pāli alphabet of Northern India must have improved upon the Southern type, and my supposition of an independent advance upon the original form of the alphabet, while the old character was still generally retained, is in a measure confirmed. But, whatever of influence this Bactrian style of writing may once have had upon its contemporary at the point of contact, it was certainly doomed to give way before its more efficient competitor and in but brief space to be no more seen !||

* J. A. S. B. III. 559—Ibid, pls. xxii. and xxxi.

† J. A. S. B. IV. pl. x. fig. 16 and VII. pl. xxxii. figs. 2, 3 and 4.; A. A. XV. p. 23.

‡ J. A. S. B. new series No. lxx. No. vii. of 1854, page 681.

§ The nine Nandas reigned one hundred years (415 B. C. to 315 B. C. Prinsep, U. T. page 99)

|| Hwen Tsaung who usually gives us very precise information about the language and alphabets of the countries he visited, is silent on the subject of the limit of the Indian alphabet to the Northward. He however, notices that in Oudyaṇa "Quoiqu'ils parlent une langue particulière, elle ressemble cependant, en grande partie, à celle de l'Inde. Les caractères de leur écriture et les usages de la politesse offrent aussi beaucoup de ressemblance (Documents Géographiques, 426). In Bannian, L'écriture, &c. ressemblent à ceux du royaume de Tokhâra;" (p. 373). Kapissa is represented [it is not clear whether by Hwen Tsaung] likewise as using a form of writing but little differing from that of the Tokhâri, but it is added, "mais les mœurs, la langue parlée et les lois sont fort différentes." (p. 392). The account of the Tokhâri language given, apparently on the authority of Huen Tsaung, though it is to be remarked that he did not visit the capital (p. 464)—is to the following effect! "Leur langue parlée diffère peu de celle des autres royaumes; les caractères primitifs de leur écriture se composent de vingt-cinq signes qui se multiplient en se combinant ensemble et servent à exprimer toutes choses. Ils écrivent horizontalement de gauche à droite." (p. 455).

A Twenty-fourth Memoir on the Law of Storms, being the CALCUTTA AND SUNDERBUND CYCLONE of 14th and 15th May, 1852.—By HENRY PIDDINGTON, President of Marine Courts.

I have named this the SUNDERBUND CYCLONE, because it is a remarkable instance of a Cyclone passing up through the Sunderbunds, thirty-nine miles to the East of Calcutta, where its fury was terrific, and because of our having fortunately been able to obtain through the Logs of two inland Steamers, and the notes of a gentleman residing at a Salt Agency on the verge of the Sunderbunds excellent data for its track there; while farther to the Northward through Jessore and Bogurah into Assam, very good notes also enable us to follow it to its termination, probably into the mountains of Bootan. The Sunderbund documents are by far the most wonderful and interesting accounts of what occurs at the centre of a Cyclone of any yet published, and with the report from Cuttack, copied from the *Bombay Times* go far to establish my theory of the Electric origin of these wonderful meteors.

Beginning with the observations from the Southward, we have the following :

At Madras

Capt. Biden on the 11th May, in a newspaper notice addressed to the Editor of the *Madras Circulator*, after commenting generally on the uncertain state of the weather at the times of the change of the Monsoon, and the perilous state of the shipping in Madras Roads when gales or Cyclones suddenly set in, says :—

“A severe gust of wind between 2 and 3 A. M. this day from N. W. to N. N. E., with lightning from the N. E. together with an irregular action of the Barometer, shews the necessity of the shipping being well prepared to encounter bad weather; fortunately the sea was smooth, and the Ships and Native-Craft held fast, but such a sudden change, and from so suspicious a quarter, should serve as a warning.

* * * * *

“The barometer has been very unsteady within the last forty-eight hours, and it fell yesterday from 29° 87' at 8 A. M., to 29° 76. at 4 P. M. and this morning I learn from the Observatory that the

Barometer is irregular, as it rose a little from midnight to 5 A. M., when it should have been falling, and has been falling ever since, when it should have been rising. We may therefore consider the weather as somewhat suspicious, but the Sea continues remarkably smooth and the surf is moderate; however for the purpose of inducing all due care and precaution I have made the signal—'Weather is suspicious.'"

Ship ENEAS, Capt. WRIGHT, from the Mauritius to Calcutta.

Wednesday, 11th May, 1852.—Lat. $9^{\circ} 28'$ North; Long. $84^{\circ} 4'$ East; Bar.* 29.89; Symp. 28.80; Aneroid 29.74; Ther. 85° . Wind shifted from S. W., thick squally weather, to W. b. N.; fresh breeze and cloudy to the Westward over the land; at night much lightning, not so much during the day, overcast appearance passing fast to the Northward.

12th.—Lat. $12^{\circ} 39'$ N.; Long. $84^{\circ} 40'$ E.; Bar. 29.85; Symp. 29.80; Aneroid 29.75; Ther. 87° . Wind between West and N. W. W. fresh breeze with a peculiar white overcast appearance, but fine; sun and stars visible at intervals.

13th.—Lat. $15^{\circ} 38'$ N.; Long. $85^{\circ} 42'$ East; Bar. 29.75; Symp. 29.72; Aneroid 29.65; Ther. 87° . Wind variable between W. b. S. and W. N. W. overcast, sun obscured, swell Westerly,† much lightning all round, particularly to S. E. Easterly, and a thick squally appearance in that direction which passed to North, several stars seen during the night.

14th.—Lat. $17^{\circ} 49'$ North; Long. $87^{\circ} 5'$ East; Bar. A. M. 29.62; P. M. 29.55; Symp. 29.66; P. M. 29.55; Aneroid A. M. 29.55; P. M. 29.45; Ther. 85° . These observations were taken at 10 A. M. and 10 P. M.; at 9 P. M. felt a short sea from N. Eastward for the first time, scarcely perceptible; the upper dense clouds appeared to move very slow to North or N. b. W. the lower clouds with the wind; stood on our course till 1h. A. M.

15th.—Sea increasing very fast, ship running at nine miles per hour overcast appearance more dense and black, stars seen at intervals, wind between W. b. N. to N. W. variable. Judging from the whole being so steady between W. b. N. and N. W. all the way up from Ceylon, more from W. N. W. than N. W. that the Cyclone was making a Northerly course and my Bar. not being very low, that it was some distance from me, I stood to East Southerly about sixty miles. At 1 A. M. on the 15th, sea increasing very much; during this time much lightning all round, com-

* Observations made at 10 A. M.

† Is this a swell to the West or from the West?

monly called sheet lightning,* my reasons for standing to Eastward were, in case the Cyclone should recurve and take a course in the direction of the Coast to Ganjam; or otherwise if broken up at the Sandheads I might experience heavy shifts of wind near False Point.

15th.—Bar. 29.73; Symp. 29.73; Aneroid 29.63; Ther. 86°; weather-glasses scarcely falling at the usual time. Weather fine, wind between S. W. and South, sea very high from Westward until in soundings, where it entirely disappeared; a very strong haze and high Southerly sea nearly resembling rollers; the haze so strong that I could not see the pilot vessel till close to her, say three miles, (although on board the pilot vessel they had seen us an hour previous). As all hands were anxiously looking out for her, I conclude the haze was much stronger to the Northward than to the Southward.

*Abridged Extract from the Log of the Barque LIMEHOUSE,
Capt. CHESTER, from the Cape to Calcutta.—Civil Time.*

13th May, 1852.—Strong breeze W. N. W. Daylight showery and heavy head swell, ship plunging very deep. Noon Lat. D. R. 16° 42' N.; Long. 86° 36' East; Bar. corrected 29.785; Ther. 82°. P. M. wind West, ship running to the Northward. Fresh gales increasing to midnight, when blowing very heavy.

14th.—2 A. M. blowing a heavy gale West, and terrific squalls. Hove to. 5 A. M. wind marked S. W.; 6 A. M. bore up, heavy cross seas breaking over the ship like a half-tide rock. Noon Lat. 17° 9' North; Long. 86° 20' East; Bar. cor. 29.685; Ther. 82°; Simp. 29.30 P. M. very threatening, making all snug; wind W. S. W. Bar. 29.55; at 7h. 30'; P. M. Ther 80°; 8 P. M. under close reefs; wind West, fresh gale. *The sky in a perfect blaze with lightning all round the compass. At 9h. 30' lightning particularly vivid in the N. W. quarter with rain.* At 8 P. M. sounded; no ground 70 fs.; at 10 P. M. tremendous heavy squalls. Hove to. Wind marked N. West to West; Bar 29.45; Ther. 79°; Simp. 29.10. Midnight blowing a very heavy gale; wind W. b. S.

15th.—Deluge of rain to 2 A. M. Thunder and lightning still heavy. Barometer rising and falling to the weather (extent of variation is not given). At 4 A. M. it suddenly fell nearly calm and in about five minutes it blew a hurricane harder than before. Many clouds full of electricity, sky appearing one mass of fire. Wind S. W.; 8 A. M. S. W. b. W. and

* During the day and night several flashes of forked lightning were observed.

† The italics are mine: this is a notable instance of lightning in the rear of a Cyclone.—H. P.

Noon S. W. Bore up at 8 A. M.; sea very confused and "in eddies"
 Noon Lat. $17^{\circ} 59'$ North; Long. $87^{\circ} 22'$ East; Bar. 29.83; Ther. 83° ;
 Simp. 29.30. Weather much more settled.

*Abridged extract from the Log of the Ship AMAZON, Captain COOTE,
 from Adelaide to Calcutta—reduced to Civil Time.*

At Noon 12th May, 1853.—Lat $16^{\circ} 41'$ N.; Long. $85^{\circ} 07'$ East; Bar. 29.68; Simp. 29.54; Ther. 88° . Moderate and fine. Wind W. N. W.; at 4, N. W.; Sunset threatening. Confused swell getting up. At 8 P. M. Bar. 29.65; Midnight, wind North, fresh and hazy, Bar. 29.65.

13th.—A. M. wind N N W. gloomy, 4h the same; Ther. 85° ; Symp. 29.40; Bar. 29.57; 6h. moderate breeze from the N. N. W. with dark gloomy weather, making preparations for bad weather; 10h. increasing from the N. N. W. with torrents of rain; close-reefed. Up to Noon strong breezes from the N. W. with thick rainy weather and high tumbling sea, Lat. *Acct.* $17^{\circ} 21'$ N.; Long. $85^{\circ} 49'$ E; Ther. 85° ; Symp. 29.42; Bar. 29.57; P. M. increasing wind with torrents of rain from W. N. W.; 1h. Ther. 85° ; Symp. 29.40; Bar. 29.57. The squalls come on with terrific violence with torrents of rain and confused sea. As we have no doubt but that there is a hurricane to the northward of us and the squalls come with such excessive violence we were afraid of being too near the centre, so keep her away E. S. E. under close-reefed fore and main topsail and reefed foresail. 2h. wind West, squalls terrific (hot and cold like the Scirocco, says Capt. Coote) sometimes the rain would be quite warm and at other times almost freezing; Ther. $82\frac{1}{2}^{\circ}$; Symp. 29.34; Bar. 29.47; 3h. Ther. $82\frac{1}{2}^{\circ}$; Symp. 29.30; Bar. 29.40. Wind West, blowing with terrific violence which obliges us to take in the foresail and fore topsail; passed a large Brig, dismasted, lying to on port tack; 4h. wind West, Ther. 83° ; Symp. 29.30; Bar. 29.40; 5h. Ther. 83° ; Symp. 29.30; Bar. 40. Wind W. b. S. blowing dreadfully hard, which obliges us to keep her right before it, but she behaves well and steers beautifully. The sky appears quite red from West to South; 6h. Ther. 83° ; Symp. 29.28; Bar. 29.40. Wind W. b. S.; snaked lightning in the N. E., kept away S. E. by S. the wind inclining to Southern. Sea very high and uneven; 7h. Ther. 83° ; Symp. 29.31; Bar. 29.44, wind W. S. W. the squalls come with unabated fury; 8h. Ther. 83° ; Symp. 29.32; Bar. 29.44. Wind W. S. W. 10h. Ther. $83\frac{1}{2}^{\circ}$; Symp. 29.38; Bar. 29.50. Blowing terrifically, but sea more regular; Midnight Ther. 84° ; Symp. 29.56; Bar. 29.48. Wind S. W. in fearful gusts, roaring like thunder. Flash lightning all round the horizon, wore ship and laid to with head to the Northward.

14th.—Up to 4 A. M. a heavy gale from the S. W. with fearful sea; Ther. $85\frac{1}{2}^{\circ}$; Symp. 29.40; Bar. 29.51. At 6 A. M. more moderate, wind S. W. very red appearance in the Eastward; 7h. a terrific squall coming up *which appears like a cloud of brick-dust*. Took in fore topsail. But before we could get the main topsail in it was up to us, and with such terrific violence that we were obliged to keep her right before it, as if it had struck her on the broad side nothing could have saved her. Managed to get the main topsail in. When right before the squall her masts bent like willows. In fact I thought nothing could have saved them. It blew with terrific violence until 10, when it moderated a little, but the wind is still West up to Noon, strong squalls with constant rain. Sea very much confused with snaked lightning in the East. Lat $17^{\circ} 00'$; by 2 Alt. $16^{\circ} 50' N.$; Long. $87^{\circ} 13' East$ by Chr.; Ther. 82° ; Symp. 29.56; Bar. 29.64. P. M. heavy squalls, wind W. S. W. kept her away N. E. under easy sail; 4h. squalls very much diminished, wind S. W. *I counted thirteen whirlwinds all in sight at one time and as high as my main mainmast. There was one passed close to me and it left a very troubled wake. They appeared to blow with terrific violence.*

Ship FAIRFIELD of Liverpool, Capt. HORNEILL, towards Calcutta.

13th May.—Noon Lat. 11.39. Strong breeze and gloomy weather from S. W. and N. W. Ship standing to N. b. W. and N. N. W.

14th May, 1852.—Noon Lat. 15.08; fresh breeze S. W. and cloudy weather with much lightning. Ship standing to N. N. W.

15th May.—Gloomy weather and steady strong breezes from S. W. 5 P. M. Ganjam Flag Staff N. W. b. W. 8 miles. Ship running along shore from 6 P. M.

Abridged Extract from the Log of the Ship "LONDON," Capt. H. O'NEILL, from Akyab to London—reduced to Civil Time.

This unfortunate ship left Akyab bound to London with a cargo of rice on the 8th May, and on the 11th at Noon she was in Lat. $18^{\circ} 12' N.$ Long. $91^{\circ} 28' East$, with S. S. W. and S. W. winds; and on the 12th May, A. M. had fresh breezes and squally weather from W. S. W. to S. E. and N. East. Ship steering to the S. W. being at Noon in Lat. $16^{\circ} 40' N.$; Long. $90^{\circ} 00' East$, going $8\frac{1}{2}$ knots. Wind and sea increasing rapidly from Noon. Wind marked N. East at 4 P. M. and North at 11.6 P. M. Heavy gale with violent squalls of wind, rain, *thunder and lightning*.* Tremendous sea rising and ship making bad weather. Hove to

* Italics are mine.—H. P.

on larboard tack; wind veering to the Northward and N. W. Barometer steady on the 10th, 11th and 12th, at 29.48, but when the hurricane commenced, it fell gradually to 28.50, and stood at that point for four hours. At 10h. 30' P. M. a complete hurricane to midnight.

13th May.—At 2h. 30' A. M. lost mizen mast and head of main mast; wreck of the mizen mast getting under the ship's bottom; 4 A. M. Wind marked N. W. and at 9 A. M. West. Cut away the main mast *which disabled one pump and injured another.** At 11 A. M. Wind is marked W. S. W. Hurricane still continuing and the ship in the utmost distress; P. M. Rudder head split; 2 P. M. Pumps choked with rice. Throwing cargo overboard. Found channel bolts and planks started and rent. Hurricane to midnight.

14th May.—4 A. M. more moderate, cargo heating and steaming, radder useless; 10 feet water in the hold and excessively hot. Noon Lat. D. R. 16° 41' N.; Long. 89° 40' East. Crew unable to stand the heat of the water and steam.

16th May.—Ship settling fast, pumps choked, and crew completely exhausted. At 3.38 P. M. abandoned the ship in the longboat. Lat. at Noon 17° 35' North; Long. 90° 40' East. Fresh breezes from S. W.

Abridged Extracts from the Log of the ADELAIDE, Capt. STEPHENS, from Adelaide to Calcutta—Civil Time.

13th May, 1852.—A. M. Calm. At 10, increasing breeze and a head swell on, ship standing E. b. N. Wind marked North. Noon Lat. 19° 27' N.; Long. 86° 15' East. 2 P. M. stormy, wind increasing to a gale with heavy swell from the Eastward; 6 P. M. severe gale; close reefs. Increasing sea as before; 8, heavy gale and stormy gusts; 8 P. M. made all snug and put the helm up to run out of the limits of the hurricane. At 10, Wind N. N. W. and at Midnight N. W. b. W. Running to S. b. E. to Midnight. Barometer and Sympiesometer as follows:

Bar. Symp. and Ther. May 13th, 1852.

	Bar.	Symp.	Ther. $^{\circ}$
12h	29.57	29.25	86°
1 P. M.	00.00	00.00	0
2	29.50	29.17	85
3	29.47	29.15	85
4	29.45	29.12	85
5	29.38	29.12	85
6	29.44	29.10	85

* The liability to this accident I have already pointed out elsewhere, but it cannot be too often urged upon owners, builders, and seamen.—H. P.

7	29.38	29.10	85
8	29.40	29.10	85
9	29.38	29.05	85
10	29.43	29.10	85
11	29.45	29.10	84
12	29.39	29.10	84

Although there appears to be a great variation in the readings of the Barometer, it is perfectly correct, as I was particular in taking it myself every hour of the gale.

D. H. STEPHENS.

May 14th.—A. M. wind N. W. b. W. Tremendous heavy gale; running under close-reefed main topsail and fore-topmast staysail. At 4 A. M. having run 48 miles to the S. b. E., S. E. b. S. and S. East, hove to with wind at N. W.; 5 A. M. wind W. N. W.; 9 A. M. West Noon Lat. $18^{\circ} 45'$ N.; Long. $87^{\circ} 23'$ East. P. M. hard gale; midnight hard gale with a great deal of lightning and thunder.

Table of the Instruments and Remarks for the 14th May. •

	Bar.	Symp.	The.	Remarks 14th of May.
1 A. M.	29.34	29.2	83	Heavy gale, A. M.
2	29.32	29.5	81	
3	29.28	29.2	80	
4	29.12	28.97	80	
5	29.15	29.2	81	
6	29.27	29.7	81	
7	29.28	29.10	81	
8	29.32	29.12	81	
9	29.37	29.15	81	
10	29.37	29.15	81	
11	29.30	29.5	81	
12 Noon	29.34	29.00	81	
1	29.38	29.5	81	
2	29.40	29.10	82	
3	..	..	..
4	..	..	..
5	..	..	..
6	..	..	..
7	29.41	29.12	83	
8	29.47	29.20	84	
9	29.48	29.22	83	
10	..	..	..
11	..	..	..
12	29.48	29.25	83	

As the wind shifted in much more curious and greater regularity than is marked in the ship's Log, which was not written up till noon of this day, and being on deck myself, with the exception of a few minutes each hour, to note my glasses and make my remarks, I give a short statement of the actual winds and courses 9 P. M. 13th until 4 A. M. 14th.

	<i>Wind.</i>	<i>Course.</i>
9 to 10 p. m. 13th	N. b. E.	S. b. W. hard gale.
11	North.	South ditto ditto and heavy rain.
12	N. b. W.	S. b. East heavy gust with moderate rain at 4, hove to on Port tack.
1 a. m. 14th	N. N. W.	S. S. East ditto with much lightning to the N. W.
2	N. W. b. W.	S. E. b. S. ditto ditto ditto.
3	N. West.	S. East.
4	N. W. b. W.	S. E. b. E.

15th May.—Wind S. W. and decreasing gale to Noon when stormy breeze and clear. Lat. $19^{\circ} 27'$ N.; Long. Acet. $87^{\circ} 12'$ East. Bar. at 8 a. m. 29.50; Noon 29.58. A set of 40 miles to the W. b. N. from Noon of the 13th, supposed to be occasioned by the Cyclone.

** Abridged Extract from the Log of the P. and O. Steam Ship
PRECURSOR, Capt. A. GRIFFIN—Civil Time.*

13th May, 1852.—A. m. moderate breezes with occasional heavy squalls from the Southward, weather looking unsettled. Noon Lat. $15^{\circ} 28'$; Long. $83^{\circ} 01'$; 6 p. m. Bar. 29.68; Symp. 29.48; Ther. 88° . Heavy dull-looking weather with leaden appearance. Wind falling light and hauling round to the Northward and N. Eastward. Not liking the look of the weather, took in and furled all sail, made preparations for bad weather by securing every thing on deck with extra lashings, &c. Slight swell from Northward, 7.30 p. m. Bar. 29.74; Symp. 29.44; Aneroid 29.64; Ther. 87° . Gloomy looking weather, a few stars visible to the Eastward and Westward. Wind very light from N. Eastward, every thing snug before night.

9.30 p. m. Bar. 29.74; Symp. 29.48; Aneroid 29.67; Ther. 85° . Moderate Easterly breeze, weather looking much clearer. Stars bright overhead, and to within 16 or 18 of the horizon, where they were obscured by a bank.

11 p. m. Bar. 29.70; Symp. 29.55; Aneroid 29.65; Ther. 84° . Clear overhead, hazy about the horizon. Wind moderate from S. Eastward, Stars steadily bright. Steering to the N. Eastward.

14th May.—3 a. m. Bar. 29.65; Symp. 29.50; Aneroid 29.56; Ther. 87° . Light breeze from N. Eastward. A head swell rising. Very squally appearance from North to E. N. E. with lightning. Stars visible to the Southward. Steering to the N. Eastward.

4 A. M. Bar. 29.63; Symp. 29.45; Aneroid 29.56; Ther. 87°. Squally dark appearance from N. W. to S. E. by the North with heavy increasing swell from N. Eastward, thunder and lightning. Rigged in the jibboom and housed the fore-topmast. Wind very light and variable. *Reduced our speed to about 4½ knots, to avoid running into bad weather, which I felt sure existed to the Northward.**

5 A. M. Bar. 29.63; Symp. 29.50; Aneroid 29.57; Ther. 88°. Shortly after 4, a light breeze sprung up from S. W. which lasted for about an hour. Wind now very light and variable. A heavy bank forming to the Northward. Lightning very low, but not very vivid. Swell very heavy and increasing from N. Eastward. Engines going very slow. Steering N. E.

6.30 A. M. Bar. 29.65; Symp. 29.45; Aneroid 29.58; Ther. 84°. Wind light from Northward, detached clouds overhead with no apparent motion. Heavy appearance all round the horizon particularly to the Southward. A very heavy sluggish swell from N. E. Steering E. N. E. and going quite slow.

8 A. M. Bar. 29.69; Symp. 29.57; Aneroid 29.66; Ther. 84°. Light N. Easterly airs. Swell still from N. E., if any thing, decreasing, sky more uniformly dark, but not looking so threatening. Steering N. E.

9.30 A. M. Bar. 29.74; Symp. 29.60; Aneroid 29.63; Ther. 85°. Moderate wind from S. Westward. Clouds appear more broken. N. Easterly swell very high, and toppling over to the Northward. Went on again full speed. Steering N. E. Saw a Paria sloop to the N. Westward, standing to the Eastward under all sail.

10.30 A. M. Bar. 29.70; Symp. 29.58; Aneroid 29.63; Ther. 85°. Moderate S. Westerly winds with detached clouds, weather altogether appearing much finer. N. Easterly swell still very heavy, but regular; ship diving deeply at times. Wind rather inclining to the Southward.

Noon. Bar. 29.65; Symp. 29.50; Aneroid 29.57; Ther. 87°. Moderate S. Westerly wind and much clearer weather. Very heavy N. Easterly swell toppling over to the Northward. Sun visible at times Lat. 17° 46' N.; Long. Acct. 84° 48' E. The ship pitching heavily.

3.30 P. M. Bar. 29.63; Symp. 29.45; Aneroid 29.55; Ther. 86°. Since 1 P. M. moderate Westerly breeze and cloudy thick weather. Heavy swell from N. E. not so regular, light rain.

7 P. M. squall of rain from N. West with lightning.

7.30 P. M. ditto ditto ditto.

8 P. M. Bar. 29.65; Symp. 29.50; Aneroid 29.63; Ther. 87°. Dark clouds passing over from N. W. Dark threatening appearance to the S.

* Italics are mine.—H. P.

Eastward. Vivid lightning to the Northward and Southward. Wind light from Northward and Westward. Swell rather decreasing. Ship pitching very heavily, occasionally a few stars visible. Steering N. E. by N. got a glimpse of the planet Venus, which gave us a Longitude $86^{\circ} 30'$. This worked back to Noon, gives a set to the Eastward of 65 miles from the previous Noon!

9 P. M. Bar. 29.70; Symp. 29.54; Aneroid 29.64; Ther. 85° . A tremendous squall struck us from the N. W. with heavy rain. It veered to West and S. W. blowing very hard, lightning very vivid, and sky all round as black as ink. Thinking it possible *that this might be the first breeze of a Cyclone, I put the ship's head to the Southward and reduced speed to about 6 knots.** Observed a small meteor playing about the main top-gallant mast head which disappeared in a few minutes

10 P. M. Bar. 29.70; Symp. 29.54; Aneroid 29.64; Ther. 85° . Dark threatening appearance. Wind moderating at S. W. Midnight very vivid lightning to the Southward with black threatening appearance. Wind from S. W. and S. S. W. blowing a fresh gale at times with rain. Barometers, &c. pretty stationary, still steering South and going slow.

15th May.—A. M. Bar. 29.70; Symp. 29.60; Aneroid 29.63; Ther. 84° . Dark angry appearance all round. Strong S. S. Westerly wind with rain, much less sea and swell, lightning less vivid. Put the ship's head round to N. Eastward again, going quite slow.

6 A. M. Bar. 29.71; Symp. 29.63; Aneroid 29.65; Ther. 85° . Gloomy looking weather with moderate S. Westerly breeze. Swell moderate from S. Eastward. Weather appearing more settled. Went on full speed for the Pilot's Ridge Station.

8, Bar. 29.68; Symp. 29.61; Aneroid .29; Ther. 84° . Noon Bar. 29.75; Symp. 29.62; Ther. 86° . Lat. $19^{\circ} 31' N.$; Long. $87^{\circ} 10'$; Pilot's Ridge Station N. $12^{\circ} E.$ $84'$.

American Ship ANGELO.

This ship was on the 12th May, in Lat. $13^{\circ} 37' North$; Long. $82^{\circ} 3' East$, and on the 15th, in $18^{\circ} 39' North$; Long. $86^{\circ} 2' East$ with variable winds from W. to S. East and S. W. a long heavy S. W. swell all day, is the only remark on the 15th, and this continues on the 16th. The Captain observed very threatening appearances to the N. East on the 14th, when in Lat. $17^{\circ} 12' North$; $84^{\circ} 10' East$; (Bar. fallen to 29.65 from 29.80 on the 13th,) but the sickness on board prevented him from making notes.

* Italics are mine.—H. P.

Report from Mr. W. BARCKLEY, Superintendent of False Point Light House.

On the 13th and 14th May, 1852.—False Point was visited with a heavy gale. On Thursday the 13th, at 2 P. M. we had a heavy squall from the N. E. the wind being in the forenoon from East; it continued squally with a low cross scud, one from the S. E. and another from S. W. with a falling Barometer until midnight, with the wind from North; when it settled in a steady gale from N. W. with heavy rain, and distant thunder, but no lightning, the gale continued steady from N. W. until Noon of Friday the 14th, when the wind changed to North, and at 5 P. M. veered round to S. E. At 6 P. M. the gale broke with the wind at S. S. E. the Barometer was at its lowest at 5 P. M. when it stood at 29.38. After that the Barometer was on the rise. There seemed to be a confused sea on, out to sea-ward, and a very heavy break upon the beach. I am happy to say there was no damage sustained at or near the Light House during the gale.

I have the honour to enclose a Statement of the Barometer during the gale.

State of Barometer and Thermometer, on the 13th and 14th May, 1852, at the Light House on False Point Palmiras.

MAY 13TH.

Hours.	Barometer.	Thermometer.	Wind.
8 A. M.	29.70	84.0	East.
10 "		85.0	
Noon.		86.0	N. E.
2 P. M.	29.65		
4 "	29.62		
5 "	29.60	85.0	North.
6 "	29.60	84.0	
8 "	29.55	83.0	
Midnight.	29.55	82.0	N. W.

MAY 14TH.

2 A. M.	29.52	80.0	N. W.
4 "	29.50		
6 "		81.0	
8 "		82.30	
10 "		84.0	
Noon.			North.
2 P. M.	29.45		
4 "	29.40	83.0	
5 "	29.38		S. E.
6 "	29.40	82.0	S. S. E.
8 "	29.45	80.0	
Midnight.	29.50	80.0	West.

Station of CUTTACK; Extract from the Bombay Times.

"*Cuttack, 9th June, 1852.*—I see by the "Bombay Times" that there has been very extraordinary weather throughout almost the whole of India. I can say for Cuttack this year that it has been the same here, and every person who has known the place for some time, remarks that it was quite unusual. We have had constant thunder-storms, attended with frequent and heavy rains, and the Barometer has been constantly oscillating, thus showing frequent breaks and irregularities in the upper currents. The wind has always had a great deal of southing in it, and has influenced the weather as to moistness accordingly. Damp hot winds like those from a vapour-bath have been very prevalent, and tatties and cooling the air are quite out of the question whilst these hold sway. The vapour percentage for March, an unusually dry month generally speaking, was as high this one as 64. We had consequently many days on which there were thunder-storms, attended sometimes with alight, but frequently with very heavy rain; the wind held firmly to the S. and S. S. W. quarter, and the air was humid in the extreme. In April the air was drier, the vapour percentage fell to 55, but in it there were many days of rain, although it was never so heavy as in the last month. The winds were Southward before. In May the vapour percentage for the first 10 days was 67.7. Mean of the Barometer, corrected for Temperature, and surface of Mercury in tube, but not for level, 29.584; Mean of Thermometer 87.9; and rain in inches 1.83. For the second ten days, the vapour percentage reached 70, Mean of Barometer 29.543, of Thermometer, in N. N. E. verandah well protected from radiation 87.6. For the whole month, Mean of Barometer 29.585, Thermometer 88.9, Dew-point 74.1, Vapour percentage 62, rain in inches 3.25. The winds were S W. 57, West 2, South 18, S. East 21, North 2, N. East 21, N. West 14, East 1, total 136. I mean by S. W. all winds that blow between the points of S. and West. Thus giving 43 of East winds, 73 of West winds, 37 of North winds, 96 of South. North winds are to South as 1 to 2.59, East to West as 1 to 1.6. The South being by far the most prevalent, may account for the extreme dampness of the air, in this month, as also the formation of the Coast at Pooree where all winds between S. W. and E. S. E. are from the sea, and damp. The Barometer was affected here by the Cyclone which raged so furiously at Calcutta on the 14th and 15th May last. The atmosphere was much disturbed, and the whole lower currents of air underwent a complete change, although the wind from the Cyclone itself did not reach us in any strength. The sky was overcast with drizzling rain until 4 P. M., and there was a most lurid and

threatening appearance in the sky to the East and E. N. E. during the whole day. The Cyclone was evidently travelling up to N. N. W., and Calcutta would be nearest its centre, when the wind came about N. by E., when it must have raged furiously. The Barometer stood thus here: Sunrise 29.420; 9 h. 50 m. A. M. 29.437; at Noon, 29.393; at 2 P. M. 29.371; at 4 A. M. 27.349, at which time it was at its lowest ebb, and from which it gradually came round again to its accustomed height. The wind was thus: sunrise N. by E.; 9 h. 50 m. A. M. N. N. W.; Noon N. W.; 2 P. M. W. N. W.; 4 P. M. W. by N.; when from that time, it came round to S. of W., thus making a half circle round the compass in the 24 hours. We had a very heavy thunderstorm here yesterday, in which I remarked a curious phenomenon, which I never observed before. The Barometer fell in the violent gusts of wind, and they *were* violent, as you may suppose when I tell you that trees of three feet in diameter were broken in two at their lower and strongest part, and great branches of mango trees in a tope not far distant, were torn off, and thrown to a distance from their stem, and the rain, which came down actually in sheets of water, was forced through the venetians into my room although they were closed and fastened at the time, and fell in a shower of spray on the middle of the floor, wetting everything; the woodwork of the venetians was wetted outside and inside at once, and simultaneously, and in sheets along the wood, as if the rain had violently driven through its pores—the venetians all the time never opened in the least, for I watched them particularly. I also, when going outside to see the lightning, which was so vivid as to make the deep darkness caused by the storm at once lighten into the brightness of the day, so instantaneous and without intermission, that flash followed flash, and peal upon peal, without a moment's pause, was driven forcibly against the wall, and held there for some moments by a pressure that I could not overcome with all my strength, and was quite exhausted when I got inside. As I was saying, the Barometer fell in the gusts to the 1-10th of an inch, and rose as suddenly to within the same space. The Thermometer did the same, and it was curious and beautiful to see how they came together at once without any pause between them: twice they fell to two-tenths of an inch, and three times to the one-twentieth, during the extreme violence of the wind, which was as strong at the time as any hurricane, but fortunately only lasted for half an hour with this extreme fury. The thunder was ushered in by four peals which fell on the ear like cannon, with an astounding crash, and the flash that followed was so white and dazzling that it quite overpowered the light for a moment, and set one blinking like an owl

when it comes to daylight. None of the other peals, save these four, were near. The lightning that came before them was all of a dark red, showing the storm evidently high up, as taking place in highly rarified air. *What was curious to observe was, that the wind was very violent before the lightning began, that when the latter was in great force and flow, the wind lulled a little, but that when there was an interval between the flashes, the wind again renewed its force with redoubled fury, proving the electric origin of the wind, as, had it not been neutralised by the flashes it would have come on as a Cyclone.* The Barometer also fell after a strong flash of lightning, equally as with a violent gust of wind, showing that in which shape soever the disturbance was neutralized, with that shape it was contented and would rise. The storm also was very violent at particular places, and limbs of trees were wrenched round and torn off in some, whilst in others they were not touched. The Barometer fell at the beginning of the storm, thus showing that it was to be a very strong one. I have never remarked it to do so in any storm before, and I always watch it invariably rising as the storm approaches. I never before observed it fall. The thatch of many of our houses was blown off, and strewed the road and gardens for some distance around. *I myself distinctly heard a peculiar noise in the wind, not that as if it echoed from the building and walls, as I heard it outside in the verandah, but a screaming kind of noise, such is described to take place in Cyclones.* "I may say that though this place is noted for thunderstorms, and though they are very violent, and that we have had many since our arrival, I have never seen anything that came up to the violence of the present one, both for violent gusts of wind, and quickness, and vividness of the flashes of lightning,—but I have said enough about storms."—*Bombay Times, July 7.*

Report from Balasore, by A. BOND, Esq. Master Attendant.

On the 12th and 13th instant, two days prior to the gale, there was a great closeness in the atmosphere, Thermometer being at Noon 92°, light breeze from the S. E. with a gathering of heavy clouds from E. S. E. to E. N. E. indicating wind and rain. During the gale at 5 P. M. of the 14th, there appeared to the E. N. E. a heavy bank of clouds shewing a storm at that point, whilst we had the wind here at N. N. W. with a stiff breeze which a ship could carry single-reefed topsails with. The weather was similar to the N. N. E. and S. W., and close up to Kontai (Hidgellec) it was not much stronger than here, no houses having been blown down.

BALASORE.

State of the weather on the 14th May, 1852.

13th May.—Bar. 29.58. Wind S. E. with slight rain; cloudy to the E. S. E. and E. N. E.: Noon Ther. 92°.

14th.—Bar. 29.58; at 6 A. M. light breeze, wind N. E. and very cloudy, Ther. 88°; at 10 A. M. Bar. 29.48. Weather cloudy and threatening with a very light shower from the N. N. E.; Noon Bar. 29.45, breeze increasing from North to N. N. W. with smart showers of rain, Ther. 86°; at 2 P. M. Bar. 29.36 with heavy rain from the Northward, and a dense cloud hanging to the E. N. E. shewing a gale there. At 5 P. M. Bar. 29.29; Ther. 84°, heavy rain with strong gusts of wind, the dark bank still remaining to the E. N. E. whilst the wind here is shifting more westerly, wind N. N. W.; at 6 P. M. Bar. 29.29; Ther. 84°, wind N. W.; at 7 P. M. and puffy and the Bar. and Ther. remained at that height till Midnight when the Bar. rose to 29.33, and the wind decreased; it having got round to W. N. W. and W. S. W.

15th.—Bar. 29.58; Ther. 83; at 6 A. M. wind S. W. fine breeze and pleasant weather, but still cloudy.

Report (as published in the newspapers) of the foundering of the ship.

DUBLIN, Capt. ROBINSON, from Calcutta bound to London.

This ship was left by her Pilot on the morning of Thursday the 13th May, 1852, and with the wind at E. N. E. she unfortunately committed the old error of standing close hauled to the S. Eastward instead of bearing up, which would have brought her quickly on the Western and S. Western quadrants of the storm. After standing on, she finally hove to so as to wait for the centre to come up to her. The following is abridged from the newspaper account.

"The commander of the *Dublin* and part of her crew have reached at Contai or Hidgellee, near Balasore. The following statement has been sent to Calcutta by Captain Robinson:—

Contai, 19th May, 1852.—I was compelled to abandon the *Dublin* on Saturday morning, she having then nine feet water in her and fast settling down.

The pilot left me on Thursday morning, the wind drawing from the eastward and beginning to puff up; at Noon double reefed the topsails. I carried on a press of canvas to get to the Southward. At 4 P. M. close reefed the topsails. Wind E. N. E. At 6 P. M. stowed the foresail, at 10 P. M. blowing with fearful violence stowed fore-topsail and hove her too under

close-reefed main topsail, her head to the S. S. E. Midnight blowing very hard with small rain at times. At 4 A. M. Friday, Barometer falling; 8, wore ship to the N. Westward, expecting by Piddington's Law of Storms that the centre bore S. S. E. from me, and by having my ship's head to the Northward, I should be able to come up to the wind as it shifted and prevent my vessel being taken aback. Lashed hammocks in the mizen rigging. At 10 A. M. Barometer still falling down to 28.30, blowing a terrific hurricane, all my bulwarks gone, the cabin doors and front of the poop stove in and the sea washing over us. All hands lashed to the pumps. I got the carpenter's axe ready to cut the lee rigging, as I expected to see the masts go over every minute. Noon, blowing still harder with dreadful rain and almost as dark as night. At 4 P. M. Barometer still falling, down to 28. The hurricane at its extreme violence, and the rain was dreadful. I was lashed close to the man at the wheel. I became quite deaf with the quantity of rain and sea that was going down my ears. At 6 P. M. Barometer rising, wind shifting to the Northward. At 7 P. M. wind N. W. hurricane still blowing very hard with a fearful cross sea on. At 8 P. M. set the goose wings of the foresail and got the ship before the sea to the Southward. At midnight wind abating fast, all hands still at the pumps, when the crew were completely done up and said the vessel was sinking; could not sound the pumps on account of the repeated heavy seas washing fore and aft. Daylight sounded the well and found eight feet water in her, her paint streak completely in and her stern windows not far from the water. I saw I had no time to lose. I asked the crew to stick to the pumps; they said they could not. I called to them and said "then the only chance that remains is to take to the boats, and it shall be that the starboard watch takes the starboard boat, and the larboard watch the port boat. I will not pick any one." One boat only reached the shore about Pipley."

Abridged Report from the H. C. F. Light Vessel STAR, Eastern Channel Station Lat. 21° 4' N. Long. 88° 14' East.

The H. C. F. L. Vessel "Star" experienced a very heavy gale of wind on the 14th. It commenced on the 13th in the afternoon from E. by N. gradually increasing, and on the 14th it blew a perfect hurricane with a tremendous sea running. Vessel pitching and labouring very much and shipping great quantities of water over all; at midnight the wind gradually veered round to N. W. with very heavy squalls and gusts of wind with a frightful sea running. On the 15th at 2 A. M. the gale abated and the wind veered round to West.

On the 14th October, 1852.—At 11 A. M. observed the vessel take a great sheer to E. S. E. perceived that the cable had parted 20 fathoms from the hawse (the vessel at the time riding with 190 fathoms) immediately let go the starboard anchor and whilst veering out cable, it parted at 60 fathoms; cleared away the larboard waist anchor, which had the chain bent on, immediately let it go and veered out to 70 fathoms, but still finding the vessel driving in a Westerly direction immediately got the starboard cable aft to the starboard waist anchor and clinched it, which no sooner done, then it was let go and veered out to 130 fathoms, which apparently brought the vessel up. At 6 P. M. the vessel took a tremendous roll and filled the starboard quarter-boat; it blowing then a perfect hurricane and a frightful sea running, cut it away to save the mizen mast and port quarter boat, Barometer down to 23.36.

15th.—A. M. blowing a hurricane from N. W.; at 1 A. M., in a tremendous squall parted the starboard cable at 130 fathoms; wind veered round to West when the gale abated, the vessel then having the chain anchor down; found we were in 25 fathoms of water from 10 to 12 miles W. S. W. of the station. In consequence of the heavy sea running, it was not practicable to heave the anchor up for fear of parting the chain, at Noon Lat. by Obs. 20° 55' North.

The vessel has sustained no damage as regards her hull, masts or rigging.

16th.—At Noon hove up, made all sail to regain our station, which we reached at 6.30 P. M. and showed the usual station light.

Abridged Report from the H. C. P. V. CAVEY, commanded by MR. R. HAND, B. P. Pilot's Ridge Station.

On the 14th inst at 6.30 A. M. the vessel parted, riding with 150 fs. of cable on the Eastern edge of the Pilot's Ridge in 24 fs. water, 3 miles E. by N. of the Pilot's Ridge light vessel.* 7 A. M. set the close reefed main topsail, reefed foresail and fore topmast staysail; wind N. E. steered down S. S. E. to stretch out clear of danger, after which I intended to lay to on the starboard tack. As I went to the Southward, wind came more North about, I then thought there was a chance of running clear of the hardest part, by continuing on my Southern course. At 10.30 A. M. furled foresail, and main topsail. It now became actually requisite for the safety of the vessel to keep her before the wind and sea, and to accomplish this it was evident that the mainmast must be cut away, not having succeeded in cutting away the main topmast; this was done, and the vessel became more easy, and steered with evident ease before the wind, and as the wind veered to the Westward the vessel's head came round to the Eastward the lowest range of the Barometer being 23.64.

* Lat. 20° 49' N. Long. 70 46' E.

*Abridged Copy of the Log of the H. C. P. V. CAVERY,
Friday, 14th May, 1852.*

A. M. fresh gales from N. E. to E. and heavy sea.

4 A. M. a heavy squall from E. N. E.

5 A. M. dirty appearance, fresh squalls from E. N. E. with rain. Ridge F. L. Vessel W. by S.; too thick to see the *Tavoy*.

6.30 A. M. parted and stood down S. S. E. under a close-reefed main topsail and reefed foresail, wind increasing and sea rising fast; each successive squall striking the vessel with increased fury, burying her at times completely under water.

About 10.30 A. M. clued up the foresail and main topsail, and with some difficulty furled them, wind from N. N. W. to N. W. steering from S. S. E. to S. E. by E.

About Noon the vessel broached to against her helm, bringing her broadside on to a terrific sea, which broke over her fore and aft; Barometer at this time commenced to fall with fearful rapidity, the wind and sea increasing every minute, the squalls bringing the vessel to leeward as far as the fair leaders of the lower rigging; endeavoured to get her before the wind (which at this time was oscillating between N. W. and N. N. W.) by hoisting the foretop mast staysail which had been bent afresh, but it blew clean away in the attempt. Having lost all management of the vessel from her being under water to leeward, and the sea breaking with tremendous force over her (washing overboard hen-coops, &c.) tried to cut away the main topmast to get her before the wind, but the mast would not go, and the position of the vessel being momentarily more perilous, it was resolved to cut away the mainmast which was done forthwith, between 1 and 2 P. M. the wreck was cleared as soon as practicable and the vessel paid off before the wind, much water continually on her decks, the scuppers not being sufficient to carry it off; it is supposed that during this time the carpenter was washed over-board, he having been last seen so employed. At about 2.30 P. M. the Barometer commenced to rise and the strength of the hurricane abated, when the wind oscillated from N. W. to W. and at 8 P. M. was W. N. W.; from this time the weather rapidly cleared, the Barometer rising as fast as it fell; at about 11.30 P. M. set the fore top-sail double reefed and hove her to on the port tack, wind at West and sea fast decreasing.

Register of Barometer, 14th May, 1852, H. C. P. V. CAVERY.

2 A. M. 29.54 Squally appearance E. N. E.

4 „ 29.54 Heavy squall from W.

6	A. M.	29.48	Passing squalls and rain.
7	"	29.44	"
8	"	29.43	The same N. E.
9	"	29.42	"
10	"	29.37	N. N. E.
10.15	"	29.30	Heavy squalls from N. to N. N. E.
10.30	"	29.25	N. to N. N. W.
11	"	29.20	Tremendous ditto ditto N. N. W. to N. W.
11.40	"	29.65	"
Noon	"	29.5	"
12.15 P. M.		29.0	"
12.30	"	28.90	"
12.45	"	28.85	"
1	"	28.78	"
1 30	"	28.64	Terrific from N. N. W.
1.45	"	28.64	"
2	"	28.64	"
2 30	"	28.70	"
2.45	"	28.77	"
3.15	"	28.80	"
4	"	28.90	Not in such quick succession.
5	"	29.0	N. W. to W.
5 30	"	29.4	"
6.15	"	29.10	More moderate W. S. W.
7	"	29.25	"
8	"	29.40	"
10	"	29.45	S. W.
Mid.		29.50	"

(Signed) R. HAND, B. P.

Abridged Report from the H. C. P. V. SALWEEN, MR. J. W. ROBERTS, B. P. South Channel.

At 2 P. M. on May 13th.—I had anchored in 12 fms. water in the South Channel, having been driven there by a fresh Easterly breeze, while taking the pilots from the outward bound ships. The South Channel Buoy bore about W. $\frac{1}{2}$ N. 3 miles and after veering to 75 fms. and sending down the top gallant yards and masts, I considered it expedient about 7.30 P. M. to veer to 145 fms. of cable as there was a chopping sea. The cable was quite new, but at midnight the vessel had parted at about 130 fms. Hove the remainder of the cable in and stood to S. E. by S. Wind fresh from

E. N. E. under double reefed topsails and reefed courses. At daylight of the 14th of May; more gusty, close reefed the topsails and about 8.30 A. M. we were under bare poles on the port tack. The wind N. E. and the sea increasing. The squalls at last became so furious and the sea of course so heavy, that as the vessel lay over, the upper dead eyes of the lower rigging on the starboard side were frequently awash.

The centre of the Cyclone passed to the Westward of us about 3.30 P. M. and at 6.30 P. M. having gradually come up on the port tack from S. E. at 8 A. M. to North, we wore to the Southward; the wind being of course West and by midnight the gale was over.

MAY 12TH, 1852.

Hours.	Bar.	Ther.	Wind.	Force of Wind.
10 A. M.	29.81	85	S. E. to E. S. E.	2
Noon.	29.75	85	"	3
4 P. M.	29.75	85	"	2
8 "	29.79	85	"	2
Midnight	29.79	85	E. S. E.	2

MAY 13TH, 1852.

4 A. M.	29.69	85	East to E. N. E.	3
8 "	29.73	86	"	4
10 "	29.72	85	East.	6
Noon	29.69	85	East to E. N. E.	5
4 P. M.	29.61	85	E. N. E.	6
8 "	29.60	85	E. N. E. to N. E.	6
Midnight	29.56	85	E. N. E. to East,	6

MAY 14TH, 1852.

2 A. M.	29.32	85	N. E. to E. N. E.	7
3 "	29.48	85	"	7
4 "	29.45	85	N. E. by E.	8
5 "	29.40	85	N. E.	9
6 "	29.35	85	"	9
7 "	29.31	85	"	9
7.30 "	29.34	85	"	9
8 "	29.30	85	"	10
8.30 "	29.29	85	"	11
8 "	29.25	85	"	11
10 "	29.20	85	"	11
11 "	29.22	85	N. N. E.	12
11.30 "	29.25	85	"	12
Noon	28.96	85	"	12

1	P. M.	28.86	85	N. by E.	12
2	"	28.80	85	N. by W.	12
2.30	"	28.80	85	N. N. W.	12
3	"	28.75	85	N. W.	12
3.30	"	28.72	85	"	12
4	"	28.80	85	W. N. W.	12
5	"	28.85	85	W. by N.	11
5.30	"	28.95	85	West.	11
6	"	29.01	85	"	11
6.30	"	29.06	85	"	11
7	"	29.10	85	W. by S.	11
8	"	29.21	85	W. S. W.	10
9	"	29.32	85	"	10
10	"	29.45	85	"	9
11	"	29.45	85	"	9
12	"	29.50	85	W. S. W.	9

MAY 15TH, 1852.

2	A. M.	29.55	85	S. W. b. N.	8
4	"	29.55	85	"	8
5	"	29.60	85	"	8
6	"	29.60	84	W. S. W.	7
8	"	29.65	84	"	7
10	"	29.68	85	"	7
Noon		29.70	85	"	7
4	P. M.	29.65	85	S. W.	6
8	"	29.70	85	"	6
Midnight		29.72	85	"	6

*Abridged Report from the Log of the Barque EASURAIN from Mr.**Mate Pilot G. B. YOUNG.*

At daylight on the 13th May, 1852, we weighed from Cowoolly Roads with a N. E. wind and fine weather, and proceeded down Lloyd's Channel; at 8 A. M. wind veering to E. N. E. anchored by Saugor Flat Buoy, with it bearing E. S. E. $\frac{1}{2}$ a mile, thinking it prudent to take up this position to ride out Easterly winds; made all preparations, having occasional puffs of wind; during the day veered to 50 fms. W. by E. N. E., Bar. 29.70.

Friday 14th.—At 4 A. M. blowing fresh from N. E. and very squally appearance, Barometer 29.60; Noon Barometer 29.40. Breeze still increasing in heavy squalls, let go the starboard anchor and veered out 20 fms. cable, we then got the third anchor over the bows and bent 45 fms. of spare cable to it. •

9 P. M. Barometer falling to 29.24: 10.30 P. M. blowing a complete hurricane with terrific gusts from North, heavy sea, Barometer 29.13 falling to 29.08 veered away cable as fast as we could, but owing to part of the crew leaving off work, we could not do it very quickly.

Midnight a furious gale from North, heavy sea, Barometer on the rise 29.10 part of crew pumping, others hiding themselves.

Saturday 15th.—About 1 A. M. Barometer 29.20: ship began to drive, paid out nearly the whole of the starboard cable; 1.30 A. M. blowing a complete gale from N. N. W. with heavy gusts and rain, heavy sea, drove foul of the *Grappler* Buoy vessel, did not see her till we were along side; when we drove past her we cut away the 3rd anchor and veered out all the chain upon it, viz. 45 fms.

2 A. M. we took the ground abaft lightly but afterwards began to thump heavily, cut away the mainmast which eased the ship considerably, I conjectured, we were aground on Saugor Flat.

3 A. M. winds veered to W. N. W. Barometer 29.40, heavy surf breaking over us, four feet water in the hold. Daylight Barometer 29.50; winds W. S. W. found that the vessel was on shore abreast of the site of the New Light House on Saugor Point with six feet water in her hold; concluded she was bilged, some of her sheathing flanks floating up, the *Grappler* Buoy Vessel sent her boat which boarded us at 11 A. M.

G. B. YOUNG, *Mate Pilot.*

*Abridged Report of the H. C. P. V. SAUGOR, MR. C. BLAKE, B. P.
Pilot's Ridge.*

On the 13th May, 1852.—At daylight the weather assumed a threatening appearance. We made all preparations for a gale. Weather growing too boisterous while we were heaving in cable could not sight the anchor.

The *Saugor's* log of winds, weather, Barometer and Thermometer for the days of the 13th and 14th of May, 1852, is as follows:

13th May.—First part a pleasant breeze, wind East, Bar. 29.61; Ther. 83°. 2nd part fresh N East wind, Bar 29.66; Ther. 85°. Noon strong E. N. E. wind, weather threatening, Bar. 29.66; Ther. 86°. Last part hard gale, wind E. N. E. Bar. 29.56; Ther. 85°. 5th part hard gale, wind E. N. E. Bar. 29.54; Ther. 84°. 6th, midnight, hard gale from N. E. Bar. 29.53; Ther. 83°.

14th May.—First part wind from E. N. E. to N. East, increasing to a hurricane, Bar. 29.48; Ther. 83°. 2nd part wind N. E. increasing to a hurricane, Bar. 29.36; Ther. 82°. 3rd Noon, wind N. E. heavy sea and rain, hurricane increasing, with Bar. 29.28; Ther. 81°. 4th part the hurricane

at its climax, heavy sea and rain, Bar. 28.96; Ther. 80°. Lastly, symptoms of abatement, wind N. b. W. Bar. 29.00; Ther. 80°. Midnight wind N. West, hurricane fast abating, Bar. 29.28; Ther. 81°.

The *Saugor* rode out this hurricane with two hundred and ten fathoms of cable. It did not blow where she was lying so heavily as others that I recollect.

*Report of the GRAPPLER Buoy Vessel, MR. J. H. CHALKE, B. P.
At Saugor.*

Friday May 14th, 1852.

Barometer.		Wind and Weather.
4	A. M. 29.78	Blowing fresh from E. N. E. with passing squalls heavy.
6	„ 28.76	Cloudy weather.
7	„ 29.68	
8	„ 29.64	Blowing hard from E. N. E. squally threatening
9	„ 29.63	weather.
10	„ 29.62	
11	„ 29.60	
Noon	29.58	Blowing a gale from N. E. with hard squalls and heavy rain.
1	P. M. 29.51	
2	„ 29.47	
3	„ 29.41	
4	„ 29.34	Increasing gale from N. N. E. with very heavy gusts and rain.
5	„ 29.32	
6	„ 29.30	
7	„ 29.28	
8	„ 29.28	Blowing a hard gale from North with heavy gust accompanied with torrents of rain.
9	„ 29.26	
10	„ 29.24	
11	„ 29.24	
Midnight	29.22	Gale increasing from North, frequent heavy gusts blowing, and rain.

Saturday, May 15th, 1852.

1	A. M. 29.21	From 1.30 to 2.30 A. M., gale blew its hardest from North to N. by W. and N. N. W.
2	„ 29.20	
3	„ 29.22	
4	„ 29.38	Drawing round to the Westward and moderating daylight.
5	„ 29.50	Gale moderating fast, Barometer rising.
6	„ 29.55	
10.30	„ 29.70	Moderate breeze from S. S. W. and fine weather.

Abridged Report from the H. C. F. Light Vessel HOPE, Gasper Station.

I beg leave to inform you that at 8 P. M. on Saturday the "*Hope*" F. L. V. began to drive, but brought up again in about 15 minutes, with the 2nd anchor, which was let go immediately she began to drive. On Sunday at 2 P. M. the vessel was anchored again on her station.

The hardest of the gale was from North to N. W. a perfect hurricane but the *Hope* behaved beautifully, and all was in readiness for a Cyclone.

*Abridged Extract from the Log of the H. C. F. Light Vessel HOPE
Gasper Station.—By Mr. THO. H. COLLINS, Mate in Charge.*

Thursday, May 13th, 1852.—8 A. M. fresh easterly winds with dirty threatening appearance; 10, veered to 145 fms. port anchor. Sunset ranged the starboard cable to 50 fms. Barometers going down during the day; at midnight Aneroid 30.10; Ship's Bar. 29.58; Comdrs. Bar. 29.65 with a fresh E. N. E. wind and a heavy sea.

Friday May 14th—Daylight blowing strong from the N. E. with threatening appearance and a heavy sea running, veered to 180 fms. made preparations for bad weather; 11 A. M. a gale from the N. E. *veering to the Northward in the squalls.** Noon blowing a heavy gale from the N. E. with heavy squalls and rain; 8 P. M. a heavy gale at N. b. W. with a heavy sea, vessel commenced driving, let go the starboard anchor; at 8.15 brought up in 4½ fms. veered to 200 fms. hauled up and ranged 50 fms. of chain cable; 9, wind N. W. b. N. veering to the Westward blowing a perfect hurricane. It will be seen by the annexed table that the Barometers fell until 8 P. M. and then commenced rising, without however any diminution in the strength of the wind. Midnight blowing a hurricane at N. W. b. W.

Saturday, May 15th.—1 A. M. wind W. N. W. forestay sail blew away; 2 to 4, gale moderating; squalls less frequent and decreasing in strength, at 4, blowing strong from the Westward and gradually moderating. Daylight 5 vessels to the Northward, one totally dismasted, and another sunk close to the upper Middle Ground Buoy; a heavy sea running and unable to offer any assistance. Lower Gasper Buoy bearing N. W.; upper Middle Ground Buoy N. b. W. ½ W. in 4½ fms. low water, ship about a mile and half S. E. from her station. 10, moderate breeze from the Westward, hazy weather and a heavy sea running.

* Italics are mine.—H. P.

A Table shewing the change in the Barometer and the veering of the wind from 4 A. M. of Friday, 14th May, to 8 A. M. of the 15th instant. H. C. F. L. Vessel HOPE.

Hour.	Aneroid.	Ship's Bar.	Comdrs. Bar.	Winds.	
4 A. M.	30.7	29.54	29.60	N. E.	{ Squalls more frequent and increasing in strength.
6 14th	30.5	29.52	29.55		
8	30.2	29.50	29.55		
10	29.98	29.45	29.50		
Noon	29.95	29.41	29.48		
2 P. M.	29.85	29.37	29.41	N. N. E. to North. N. b. W.	
4	29.73	29.20	29.28		
6	29.52	28.97	29.00	N. W. b. N.	
8	29.45	29.00	28.98		
9	29.50	29.10	29.05	N. W.	
10	29.55	29.16	29.11		
11	29.61	29.24	29.20	N. W. b. W.	
12	29.65	29.32	29.30		
1 A. M.	29.72	29.40	29.38	W. N. W.	
2 15th	29.85	29.53	29.50	W. b. N. squalls less frequent and decreasing.	
4	29.92	29.60	29.59	West a strong breeze.	
6	30.00	29.65	29.63		
8	30.7	29.67	29.70		

*Reports by Electric Telegraph from Diamond Harbour,
14th May, 1853, State of the Weather.*

At Diamond Harbour.—Morning light winds from N. East, with drizzling rain, at noon strong breezes from East, attended with slight showers of rain, and cloudy weather. Thermometer at noon 87°. Wet bulb 78°. From noon till 6 P. M. blowing violently from East, with heavy rain.

Aneroid Barometer, at 10 A. M. 29.600

————— at 4 P. M. 29.400

Standard Barometer at 7 P. M. 29.450

Fall of rain, at Diamond Harbour, from noon till

6 P. M.	..	..	..	..	..	Inches 0.70
Calcutta,	..	..	..	..	..	0.20

to 7 P. M. 14th May.

15th May, 1852, *Diamond Harbour Report.* Received at 7 A. M.

From 8 P. M. to 12 P. M. last night blowing violently from East, with heavy rain—at 1 A. M. the wind veered to N. West, blowing still harder. At 4 A. M. a perfect hurricane—still continues—several huts and trees

have been blown down in the village—our Raingauge has also been blown down, therefore we are unable to give the fall of rain.

Standard Barometer at 10 A. M. 29.540

State of the Weather.

At Diamond Harbour.—From 6 A. M. blowing furiously from West, and slight rain, the premises and the station huts have been much injured, Weather cloudy. Thermometer at noon 83°. Wet bulb 78°.

Aneroid Barometer, at 1 P. M. 29.55

————— at 4 P. M. 29.55

On the 16th, fine Southerly breeze is reported.

Register of the Barometer and Wind during the Gale of the 14th and 15th May, 1852, on Board of the P. and O. Co.'s Steam Ship HINDOSTAN, Garden Reach.

Time.	Bar. by Cox.*	Bar. by Lilley.	Wind.	Hindustan. Garden Reach.	
8 A. M.	29.67	..		Friday, May 14th.	
				Ther.	
Noon	29.58	..	E. N. E.	80°	
3 P. M.	29.50	29.52	..		
5.30	29.46	29.43			
8.0	29.40	29.36	N. N. E.	78	
9	29.37	29.33			
10	29.27	29.24		75	
11	29.19	29.13			
Midn.	29.9	29.63	North.	75	
1 A. M.	28.94	28.84	..	..	Saturday, May 15th.
2	28.87	28.83	N. W.	75	
2.50	28.89	28.88			
4	29.01	29.03	West and		
5	29.13		W. N. W.		
6	29.26	29.23		75	
8	29.41	29.35		78	
11	29.53	29.42			
Noon	29.55	29.48	W. by N.	80	

* Barometer compared with the Standard at Madras Observatory, each Instrument 30 feet above the level of the sea.

Calcutta Newspaper Account.

During the storm of Friday night, nearly all the ships in the Cooley Bazar moorings parted their own chains. The *Glentanner* parted her own chains at the Calcutta moorings, and went on the bank; it is thought she will have to go into dock. The *City of Calcutta* dragged both her anchors, got foul of the Government moorings, and got on shore at Chandpaul Ghat, little or no damage done. All the ships in the harbour dragged their anchors more or less. Numbers of boats, bauleahs, budge-rows, pinnaces, and country boats were swamped, and a great deal of property lost. The river, on Saturday morning, was covered with bales of jute, silk, opium, masts and spars of vessels, the wrecks of dinghees, &c. Some lives are supposed to have been lost, but as the gale came on in the evening, the boats were mostly moored to the shore, where escape was easy.

In Calcutta much mischief was done to buildings. An unfinished house in the Chitpore road, belonging to one of the Mullick family, fell down upon the adjoining stables, and destroyed some valuable horses and carriages. In Moorgeehutta a lower-roomed house fell in, and buried an elderly lady and her two grandchildren under the ruins. By the exertions of a neighbour, Mr. Arathoon, the lady and one of the children were extricated without serious injury, the other child, a girl of five years old, was killed.

In the suburbs, hundreds of huts were levelled with the ground, and the gardens every where laid waste.

On the Barrackpore road about fifty of the largest trees were uprooted, some of them fell across the road, making it nearly impassable in several places. About the station many large trees were prostrated, but the Park fortunately escaped with little serious injury, though the fences were blown down in many places.

About Calcutta the trees are stripped of fruit, mangoes particularly, but what is very remarkable is the number of crows which have perished. Heaps were piled up at the corner of many streets on Saturday. They generally take care of themselves, but this being the breeding season, it is supposed they would not quit their nests. There has been great destruction among the yachts. Two or three are lying sunk near the Fort, and several others are reported missing.

My own observations at Calcutta are as follows.

14th May, 1852.—During the night, squalls and light rain from the Eastward with puffs of wind, rising and falling at times. At 2 A. M. Bar.

low, about 29.76.* Daylight to sunrise, fresh breeze N. East. A bank of stratus and nimbus from East to N. East with heavy masses of loose ragged cumuli which were breaking and passing over us in loose detached ridges, and webs of smoky scud. About 6 A. M. weather seemed to clear up from the Eastward but no rise of Barometer.†

At 10 A. M. Bar. (corrected to that of Surveyor General) 29.71; Symp. 29.90.

N. B. No rise since 4 A. M. rather a fall, Bar. being then about 29.74. Fresh breeze N. E., masses of dark smoky cumulous scud travelling from the Eastward. Bright sunlight where openings occurred and larger dark masses passing now and then. Wind E. N. E. blowing in strong squalls and puffs at times.

At 1h. 30' P. M. first dark rain squall occurred, at 1 P. M. Bar. 29.659; Symp. 29.85; Ther. $85\frac{1}{4}^{\circ}$. Squalls and puffs as before. Wind E. N. E. to N. East.

3h. 40' P. M. Bar. 29.609; Symp. 29.81; Ther. 85° . 4h. 5' P. M. Bar. 29.529; Symp. 29.75; Ther. $84\frac{3}{4}^{\circ}$. Gloomy squalls and rain. Wind N. East. Scud N. East.

5h. P. M. Bar. 29.509; Symp. 29.75; Ther. 84° . Wind N. N. E. to N. East with squalls and drizzling rain, but the rain in loose large drops! At 10h. 10' Bar. 29.309; Symp. 29.60; Ther. $82\frac{1}{4}^{\circ}$. Blowing hard from E. N. East as nearly as can be guessed.

At 11h. 20' Bar. 29.169; Symp. 29.50; Ther. 82° ; blowing a hard gale, but too dark to ascertain its exact direction; tremendous squalls at times.

15th May.

Time.	Bar.	Simp.	Ther.
A. M. 0h.5'	29.079	29.42	82°
25	.009	.39	..
1. 5	28.879	.33	..
1. 45	.859	.30	..

Wind now to the Westward of North; heavy gale.

2h.15'	28.829	28	$81\frac{1}{2}$
3 . 0	.909	34	$81\frac{1}{2}$
3 .20	.989	39	..

Wind N. Westerly.

4h.00'	29.059	44	$81\frac{1}{2}$
6 .30	.329	62	81

Heavy gale at West, scud from S. West.

8h.20'	29.499	29.64	81
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Decreasing gale West. By Noon, weather comparatively fine.

* Register blotted.—H. P.

† The treacherous clearing up for a short interval which I have so frequently adverted to.

Report from Baugundee, a Salt Agency Station, in Lat. 22° 38' N.; Long. 88° 57' East; about 39 miles E. b. N. from the Flag Staff of Fort William, by F. CRANK, Esq. Bengal Salt Agency.

It will be seen that this Cyclone fortunately* passed up to the Eastward of Calcutta, through the Sunderbunds where it not only tore to pieces every thing in its passage, even to a *pucka* (brick-and-mortar-built) house, but drove the river-steamers in their sheltered creeks into the jungle. A relation of Mr. Crank's shewed and allowed me to make some extracts from a private letter, and these together with Mr. Crank's very intelligent replies to a letter of queries subsequently addressed to him by me, have enabled me to frame the following very interesting narrative of the passage of the centre of a Cyclone on shore by a person, who was evidently perfectly cool and collected. In this summary, it will be recollected that the facts and most of the phrases are Mr. Crank's, and I have indeed sometimes given my own queries to introduce his reply verbatim.

"For a day or two preceding the gale there was a heavy scud from the Southward with a high temperature of from 90° to 93 in Mr. Crank's rooms to the Westward. The gale set in from the N. East on the 14th but by the time it was blowing a gale, it was at about E. N. East, and when the hurricane was at its height the wind was about two points to the Northward of East. Up to 2h. 30' A. M. of the 15th, it went gradually veering round to the Southward when a sudden lull of about ten minutes duration took place. He was looking from his door to the Westward when he heard the sound of the tempest approaching from the opposite point to that at which it had commenced, or South West. The sound was terrific and it burst with more violence than before on the Western side of the house tearing the thick beams of the verandah out of their places in the wall, and scattering them like straws, whilst the verandah itself covered with a double layer of Syrian or flat tiles, was pierced by it in several places; holes of 6 or 8 feet in diameter being blown through the roof. He then thought it prudent to place his wife and family in security. The interval of the lull as before said was perhaps ten minutes when the wind shifted suddenly from about E. b. S. or E. S. E. to the S. West, and the hurri-

* I say fortunately, for we were thus 35 miles to the West of its centre where it evidently was of terrific violence, and had its track been up the Hooghly not a ship then in the river would have escaped. We may also judge in some degree how important to a ship even this short distance from the centre must be, and how it occurs so frequently that one ship is utterly torn to pieces at the centre while another escapes at a very short distance from it.

cane which ensued was terrific. When he left his house all the venetians, doors and glass windows of the upper and lower story were all blown in. The roof of one room had fallen, and the brick pillars of the verandahs were broken in two or three places, the storm had a clear drift through the house and some of the furniture was even blown out of the windows; chairs, &c. being found on the bank of the river the following morning. There was no thunder or lightning during the storm. Mr. Crank being repeatedly out in it, so that he speaks very positively as to this, which he must have perceived had there been any. It was at three in the morning that Mr. Crank's family were obliged to take shelter; first in a low cow-house, of which the roof also beginning to give way they were driven as a last resource to a *pucka* (brick-built) pig-stye! which being still smaller and lower, and substantially constructed, fortunately withstood the fury of the elements,* which was so great that the family were repeatedly blown down in their retreat from the house to their place of refuge.

Mr. Crank stating in his private letter that "earthquakes prevailed throughout the whole night," my query on this head and his very important reply are as follows:—

In "What were the nature of the earthquake shocks you mention, and are you quite sure of them, as distinguished from the vibrations of the house in the gusts of wind? Are you also familiar with earthquake shocks so as readily to recognise them?"

Answer.—The shocks I experienced when out of the house, at about 2h. 15' A. M. of the 15th were oscillatory and very severe. One I experienced in the upper story of my house I cannot correctly describe. Another at 4 A. M. or thereabouts was of the same character as the above. It could not in this case have been the vibration of the building I was in, because it is an extremely low one, being used as a pig-stye and pigeon-house, and is a very strong *pucka* edifice. As I have experienced many earthquakes both in Persia and Assam, and am generally calm and collected I feel sure the shocks were those as described (to his Calcutta friends) and that throughout the night. After the hurricane set in, they were repeated. With the first shock outside the house, I plainly experienced a very unpleasant smell which I attributed to some gaseous exhalation;† I have noted the same peculiar odour on other similar occasions,

* This is exactly the history of the Mauritius and West India planters, who on the large plantations have a strong low built "hurricane house" ready for these occasions, and on the poorer ones the families take refuge in the negro huts in sheltered spots.

† Perhaps Ozone?—H. P.

and I fancy it is corroborative of one of the theories anent these phenomena."

Mr. Crank mentioned also a confusion of strange and horrible sounds, and he describes them as follows:—

Query.—*What were the nature of the sounds you describe? You were so near to, or at the passage of the centre, where these singular noises are frequently described, that it is of much interest to know something about them?*

Answer.—"The sounds noted in my letter to Mr. R.—were of so peculiar a nature that I can scarcely describe them. You have doubtless been on the deck of a ship in a dark night where the upper sails have flapped against the masts? Such like sounds met my ears on the night of the 14th.* Then it would appear as if vast bodies of winged animals were hurrying across, whose wings were striking against each other in a thousand directions.† These sounds were blended with others not less unusual—crashing like trees—whistling—roaring—or as if heavy bodies were falling from a height against each other, and by the concussion were shattered into fragments. At this time I was out on the plain, and the strife of the elements was awful; ever and anon such a pressure of the wind from above, that I was almost crushed to the earth; then it would strike me on one side—then on another, and I came to the conclusion that I was in the centre of a whirlwind.‡ I was for a time stupified. To turn my face to the Eastward for more than a few seconds was impossible, the rain was driven with the force of arrows into the face, and the oppression was similar to what one feels on riding a fast horse at racing speed.

Unfortunately, and this he very much regrets, as we must also do, the only instrument which Mr. Crank had with him was a Thermometer, which stood till the lull at about 88° in a room, but he is not certain as to a degree or so, not having his glasses at hand. At the time of the lull it became so exceedingly cold that every one remarked it, and on looking at the Ther. he found it standing at 65 or 66°! At daylight it was at 90° or something less."

* The cracking of a huge electrical machine we might suppose to produce such sounds?—H. P.

† The rushing noise of the currents of air as generated by the electric discharge? see Peltier.—H. P.

‡ This passage is one of immense importance, for together with others which will soon be published, it settles the question of any upward tendencies of the wind at the centre in the negative, and very strongly corroborates my theory of electric and spiral currents.

In describing the track and ravages of the storm, Mr. Crank mentions that a large Casuarina tree, at about 100 yards distant from the East verandah of his house, was literally cut off even with the surface of the earth. His Bauleah which was securely fastened adjacent to it was *torn to pieces*, the roof of the cabin being thrown many hundred yards to the Westward; while some of the windows were picked up at nearly a mile distant.* His house was reduced to such a ruin that it was dangerous to approach it, the parapet wall, balustrades, &c being, as it were, cut off.

Mr. Crank seems to think that the force of the storm was most strongly felt for about half a mile on each side of Baugundee, and he estimates the track of country over which it passed by the accounts from his salt *chowkies* (station houses). This would make the centre one mile in breadth only, and accounts in part for the awful violence of it within that limit, for it has always been found that when the diameter of the central hll is small, the intensity of the Cyclone there is much greater.

He farther states that great loss of life, and of cattle and other property took place in consequence of the excessive and sudden rise of the rivers all over the Sunderbunds, which obliged those who had no other resource to take refuge in the trees.

Reports from Steamers in the Sunderbunds.

Two of the River Steamers, one of them the property of Government and the other belonging to the Ganges Steam Navigation Company, were driven on shore in the Sunderbunds;† and carried by the storm wave up *over the trees*! into the jungle, from whence they had to be extricated by cutting canals after the Cyclone was over. The following are their logs which fortunately serve very accurately to mark the track of the centre, as they were on the Eastern verge of the centre (wind veering from E. S. E. to S. S. E. and South, to West) and their positions being at a short distance from each other only and 44 miles S. b E. of Baugundee.

* In a severe Typhoon from the Bay of Manilla in 1816, when all the ships lying at Cavite were driven on shore, an American ship lost her cutters, which were blown from the davits. About a month after the gale the Captain of the ship taking a walk into the country saw something very strange in a mangoe tree near a village about four miles from the anchorage, and paid an Indian to get it down for him. It proved to be the stern of his own cutter!

† Indian readers do not require to be told, but some European ones may, that the Sunderbunds comprise a vast extent of low jungly islands, as large as the principality of Wales, intersected by a thousand large and small rivers, streams, and creeks forming the Delta of the Ganges and Hooghly, and in which boats are perfectly sheltered.

Abridged Log of the H. C. Steamer "BERHAMPOOTER" P. M. CAWLEY, Commander, towards the Presidency; 63rd trip. N. B.—At anchor in the Soyah in Lat. 21° 54' N.; Long. 89° 02' East, by TASSIN'S Map.

Friday 14th May, 1852.

Bar.	Ther.	Time.	
29.55	82°	A. M.	Strong Easterly winds and cloudy.
..	..	5.00	Steam up, weighed, and proceeded full power.
29.50	88	Noon	Ditto winds with passing showers of rain.
..	..	1.10	Passed steamer <i>Chunar</i> , at anchor in the Fringhee Khall.
..	..	3 P. M.	Entered Attarah Banka river.
29.35	70	4.00	Increasing breezes and passing squalls from E. S. E.
..	..	5.15	Roymungul river.
29.20		5.30	Bearry Khall; observed every appearance of a gale from the Eastward, ran well up the Soyah for safe anchorage. Owing to the weather having a threatening appearance, Captain Cawley orders an Officer's watch to be kept.
28.80		7.15	Anchored for the night in 4 fathoms with 70 fms. on the best Bower and 50 on the small; blew off steam and kept fires low, the river apparently well sheltered and very smooth water.
28.62		8 P. M.	Gale increasing. Got the steam up and worked ahead full power.
28.45		10.00	Gale still increasing, observed the vessel driving with engines working full power and both anchors ahead.
27.80		Midgt.	Vessel driving, gave her a little more chain, unable to give her much for fear of the wynch breaking. Midnight blowing a hurricane from S. S. E. the large cog-wheel of the wynch carried away—both chains parted and vessel took the bank. Sea making a clean breach over her, and crew employed baling water out of the vessel, the Flat Matabangah parted from beam lashings, and both banks being inundated, the hurricane blew the vessel about half a mile on the bank, blowing away sails and topmasts, rigging, bamboos, boats, oars, &c.

Saturday, 15th May, 1852.

- A. M. Blowing a hurricane from S. S. E. vessel driving over the thick jungle, sea breaking over her.
- 2.30 Observed vessel stationary—buried in thick jungle, the sea still washing over her.
- 28.30 65 2.45 Gale moderating and veering to the Westward stopped the Engines and blew off Steam.
- 28.65 .. 4.00 Gale veering to N. W. and moderating. Daylight observed the Matabangah high and dry as ourselves, bearing S. E. by S. about 100 fathoms from us ; and the nearest bank of the river N. E. by E. about 375 fathoms and nearest to a Nullah N. E. by N. about 275 fathoms. Overhauled vessel's hold and found no damage done, sent Mr. Smart to the Matabangah, which was found to have a tree through her bottom, which the Commander soon stopped up. Mustered the crew and found all correct. No lives lost, the crew's provisions much damaged.
- 28.92 .. 8.00 N. E. breezes and cloudy, our Jolly-boat being lost, launched the flat boat through a creek and sent Mr. Smart, mate of the steamer and Mr. Wheelan, Clerk of the "Matabangah" with four men from each vessel up to town with reports, and for assistance ; commenced clearing away the wreck and jungle.

*Ganges Steam Company's Steamer "CHUNAR" in the Sunderbunds,
May 14th, 1852.*

At 5 A. M. cloudy weather with fresh Easterly winds.

9.45, entered the Fringhee Khall.

10.15, wind increasing with squalls, turned back for an anchorage.

10.40, wind E. N. E. anchored in $5\frac{1}{2}$ fms. kept Steam back for the flood.

3 P. M. Steamer *Berhampooter* with "Bhagrutty" passed on her way to Calcutta.

4, wind increasing to a gale with rain, let go the 2nd anchor and veered to 30 fms.

8, Gale increasing, veered to 50 fms. best bower, 30 fms. on 2nd ditto.

10, Wind East, terrific squalls, wind gradually veering round, thick

rainy weather. Sea washing over all, pumps carefully attended to. Wind S. East, veering to the Southward with squalls, blowing a hurricane at times, vessel drove on to the opposite shore, taking the bank aft, slackd Steam.

Midnight, both boats swamped with the sea washing over them, the roof of the 2nd officer's cabin blown off. Crew employed at the pumps.

Saturday, May 15th, 1852.

0.30 A. M. winds veered to South, the awning deck over foredeck, blew off, taking all the stanchions fore and aft both sides with it into the jungle about 100 yards.

4.30, wind still as violent and vessel shipping great quantities of water, every thing inundated and blowing to pieces.

6, Wind S. E. moderating, got the boats alongside, baled out.

7.30, succeeded in getting the vessel off the bank, weighed and proceeded a little way and anchored. Sent crew to pick some of the wreck of the awning deck.

Observations made at Chandernagore, by Mr. G. B. SMART, Master Pilot, H. C. M.

13th May, 1852.—Sun rose this morning very pale, appearing like a large moon. In the morning Northerly wind; during the day variable from E. N. E. to S. E. Noon Barometer 29.68.

Chandernagore, 14th May, 1852.

Hour.	Bar.	Wind.	Remarks.
Noon	29.47	E. N. E.	All the forenoon Barometer 29.50, wind from E. N. E. and squally with passing showers of rain.
2 P. M.	.42½		Ditto Ditto.
3	.41	..	
4	.35	..	
4.30	.32	..	
6	.30	..	
7.30	.28	N. E.	Increasing wind, and squalls more frequent.
9	.24	..	
9.30	.20	..	
10	.17½	..	
10.30	.15	..	
11	.10	N. N. E.	Blowing very hard, and squalls increasing.
11.30	.5	..	Strong gale and squalls increasing in violence, and in quicker succession.
Midnight	29.0	..	

Chandernagore, 15th May, 1852.

Hour.	Bar.	Wind.	Remarks.
1 A. M.	28.90	North	Gale increasing in violence as well as the squalls.
1.30	.82	..	
2	.77	..	
2.30	.72	..	
3	.68	N. W.	Blowing a fierce hurricane, and squalls in violent gusts, and in rapid succession: The lowest fall of the Barometer.
3.30	.65	..	
4	.69	..	
4.30	.75	..	
5	.80	W. N. W.	Wind and squalls moderating in violence.
5.30	.86	..	
6	.95	..	
7	•29.2	..	
8	.10	West	Still more moderate and weather clearing up. Squalls occasionally.
9	.20	..	
10	.27 $\frac{1}{2}$..	
11	.32	..	
Noon	.37	W. S. W.	Moderate wind with fine weather. Barometer rising rapidly.

*Reports from the District of Kishnaghur, from Mulnath Factory,
Lat. 23° 05 $\frac{1}{2}$ ' N.; Long. 88° 46' E.*

The following account of the late Cyclone is contained in a letter from the district of Kishnaghur:—

“We have had a frightful storm here, the mischief done is almost incredible; round this place nearly every tree is either down or injured, and from all the factories I have accounts that nearly every thatched building is quite destroyed. In the villages also it is quite sad to witness the havoc that has been made, trees and houses all lying in one grand chaos. Great numbers have received serious injuries, and there has also been a very serious loss of life. On Friday it blew pretty fresh all day, with the Barometer gradually falling. In the evening the wind increased, and about 12 o'clock the hurricane began in earnest. It was worse between 4 and 5 o'clock—the wind then from the N. W. and Barometer standing at 28.4 where it remained till a quarter-past 6, when it rose to 28.6. At a quarter past 7 to 29, quarter-past 8 to 29.2, at 9 o'clock to 29.3, and at half past 10 to 29.4 when the storm broke, though it blew violently till noon. I think we must have had it here more severely than even you have had it in Calcutta—though you appear to have had it badly enough. In this concern, thirty people have been killed, and I have just heard that my boat, which I had sent for a friend, has gone to the bottom,

and that a poor chuprassee and four of the men have been drowned."—*Calcutta Englishman*.

Letter from Kishnaghur from Major LANG, 36th N. I.

Lat. 23° 26' N.; Long. 88° 35' East.

I greatly regret that I cannot furnish any Barometer register, but perhaps the following account of the storm, as experienced at this station, may be acceptable.

Throughout the whole of Friday the 14th instant, the weather was unseasonable, with heavy clouds and the wind hanging to the North of East; there were occasional squalls during the day. Towards evening, although appearances continued threatening, the wind was moderate and remained so till about 9 p. m. when it began to freshen considerably.

Up to this time I think the wind was variable, changing a point or two towards the North and falling back again to East. At 10 o'clock the storm may be said to have commenced;—the wind then blew in strong squalls from about E. N. E. gradually veering to the North. By midnight it was due North, and from this point it continued to blow with great fury for several hours. At times there was heard a low rumbling noise, which might well have been mistaken for thunder, but I believe it was the effect of the wind; there was no lightning.

From 2 to 4 a. m. of the 15th, the hurricane was at its height; it then, as far as I could judge, blew from two or three points to the West of North. The gusts at times were crushing, and it seemed as if nothing could withstand their force; they were accompanied with a continuous driving rain. At day-break there was a scarcely perceptible decrease in the fury of the storm. The clouds lay very low, and the scud was borne along with great velocity, the rain continued at intervals. From sunrise the gale gradually moderated, although up to 12 o'clock there were occasional squalls, which, but for what had preceded them, would have been thought unexampled in their violence.

At 6 a. m. the wind was W. N. W. veering slowly to the West from which point it continued to blow freshly till the afternoon when the weather cleared up.

Letter from Katgurrah, from R. P. SAGE, Esq.

Lat. 23° 16½' N.; Long. 88° 57' East.

Saturday, 8th May.—A. m. cloudy. Wind S. W. moderate, very heavy rain for two hours from S. E. night strong S. E. wind.

Sunday, 9th May.—A. M. weather clear, with strong S. E. wind. Noon wind S. W.; P. M. very hot, atmosphere hazy; 6½ P. M. a wind, stormy appearance to the N. W. night close and cloudy.

Monday, 10th May.—A lurid haze prevailing throughout the day. Wind high, variable N. E. to S. W.; P. M. high wind throughout the night.

Tuesday, 11th May.—The same as yesterday.

Wednesday, 12th May.—Atmosphere somewhat clearer, wind as yesterday.

Thursday, 13th May.—A. M. heavy clouds to the South. Wind S. E. and blowing strong throughout.

Friday, 14th May.—A. M. heavy black clouds all round, wind blowing very strong from the East all day. P. M. cloudy; 7½ P. M. wind increasing till 11 P. M. when it blew a hurricane from the Eastward, midnight wind from N. E. with much rain.

Saturday, 15th May.—1 A. M. gale blowing with tremendous force, trees and houses falling in all directions; gale continued with unabated force till 5 A. M. when it lulled slightly and the wind veered round by the North to the West, whence it blew very hard till near 9 A. M. whence the wind fell considerably, and at 10 A. M. the rain ceased. 3 P. M. wind high from S. W.

Sunday, 16th May.—Light S. W. & S. wind, with very hazy atmosphere.

Monday, 17th May.—A. M. clear, few clouds about, wind S. E.; 9 P. M. a North Wester with a shower of rain.

The whole country round wears a most desolate aspect.

Report from the road from Jessore towards Calcutta.—By

G. F. COOPER, Esq.

Being at Jessore during the late storm and returning thence direct by dāk to Calcutta on Friday last I was enabled to make a few observations which, though in all probability, you are already acquainted with, I will endeavour to lay before you.

During the whole of the previous day we had a high East wind at Jessore which increased during the night to a perfect hurricane. At or before break of day the storm was at its greatest fury, the wind being then from the South East, later in the day and when the storm had abated, the wind was N. Westerly.

For some twenty miles the South side of Jessore, the storm, *judging from the fallen timber*, appears to have taken the same course, but after passing that distance or say thirty miles from Jessore, the current appears

to have entirely changed ; all prostrate timber, &c. lying N. Westerly, the direction of the current being diametrically opposite to that experienced at Jessore. This at once indexes the centre of the Cyclone as being mid-way between the distances I have named.

Perhaps I have not expressed myself in a very lucid manner, and will venture upon reiterating my statement ; at Jessore and for twenty miles or so on the road to Calcutta, the fallen trees were lying across the road-way from *left to right* (S. E. to N. W.) then after passing that distance I found them lying from right to left (N. W. to S. E.) The road, as you may be aware, being in a straight line running to the N. E. from Calcutta, and the intermediate distance between the two places being eighty-six miles.

The points of the compass I have named, you will please to consider *as about* the direction from whence the wind blew and not restricted to a few degrees.

EDW. THEO. COOPER.

P. S.—Great ravages were committed by the storm. At the spot I have surmised as the vortex, I observed a *prostrate* banyan tree, whose stem could not measure less than 25 feet in circumference.

Jessore, Lat. 23° 9' ; Long. 89° 12' East.

The following is from Jessore :—" During Thursday 13th, fresh breeze from the Eastward with cloudy appearances. 6 P. M. wind steady at about E. N. E. with very threatening appearance. At 11 P. M. fresh gale from ditto with occasional smart squalls. From 2 A. M. till 6 A. M. of the 14th, a regular "hurricane" with rain. At 6.30 A. M. wind shifted round to W. S. W. and came down with great fury, carrying every thing before it. At noon moderate Southerly wind, with occasional showers of rain. At 4 P. M. weather fine. During the gale of the 14th, Friday, every hut has been levelled to the ground, killing natives without number. The abkarree office blew to pieces ; all the stables in the station ditto ; pukka houses have suffered greatly, windows, glasses, sashes, &c., all blown away, trees of many years standing are now laid flat on the ground. Such havoc has not been witnessed in Jessore for many a year." •

• *Extracts from a letter from Muddendarrie Factory, district of Dacca, Lat. 23° 28' N. ; Long. 89° 40' East.*

" I observe by your Monday's *Englishman* that with you the gale commenced from the N. N. E. at 1.30 A. M. of the 14th, and your first rain-squall occurred at noon of the same day. With us it was quite different, for

there was scarcely any wind at all, till sunrise on the 14th, when a strong breeze from the East sprung up, and continued all day, the day being bright and clear, so much so, indeed that I never once thought of a gale being so very near at hand. I retired to my bed at my usual early hour, and slept soundly till midnight, when I perceived that the wind had somewhat increased; but still there was no rain, and I in consequence thought not of a gale. At half-past 2 A. M. 15th, I was roused up by a crash in the verandah, and the clapping and banging of doors and windows all over the house. I ran into the Southern verandah, through which I found the wind and the well known storm sleet was rushing like a torrent, announcing at once what was probably in store for us. I made all snug, and prepared for a blow, and a blow we had with a vengeance. From 3 A. M. of the 15th till 6 o'clock, it blew as hard as it *could*, and from 6 till 9 it blew still *harder*! My house is a very strong *pukka* one, yet it shook from end to end under each sounding shock it received from the terrific gusts of wind; doors, windows, sun-shades, venetians, &c. &c. were blown in and out, and sent flying all round the factory like shreds of brown paper, trees were torn up by the roots, sheds and houses laid low. The river which had risen 6 feet, lashed its banks in fury, till the said banks came toppling over with a tremendous splash and surge, to add to the general confusion. During all this time the wind was veering from East to South East, to South; at 9 it went round to South, then to S. W., and eventually (at about 1 P. M.) died away at West. Since the gale we have had one S. Wester and two North-Westers, accompanied with heavy rain."

*The following is an extract of a letter from Malda, Lat. 25° 03' N.
Long. 88° 04' East, 20th May.*

The following is an extract of a letter from Malda, 20th May:—

"The Cyclone noticed in your paper of the 17th instant visited this district, but as its centre must have passed considerably to the Eastward of us, little damage has been done to our plant.

"Not being in my own house during the gale, I could not notice the Barometer, which I much regret.

"14th May.—On the afternoon it was evident enough that bad weather was in store for us, but as we were much in want of rain to refresh our drooping plant, the heavy clouds were hailed with delight. The heaviest looking clouds were towards the South-East, and were accompanied with vivid lightning. I noticed nothing more, and it was only when I rose on the morning of the 15th, that I was aware that a Cyclone was passing over, the centre of which must be some distance to the Eastward.

"6 A. M.—Blowing a strong gale from the N. N. East, and rain, not very heavy.

"8 A. M.—Wind increased, some of the gusts very heavy, North by East.

"Noon.—Blowing from due North, rain heavy.

"3 P. M.—The wind had veered to about N. N. W., and its force considerably moderated, rain less heavy.

"5 P. M.—The gale had evidently broken, the blue sky appearing in places and the wind now blowing in occasional gusts, greatly fallen, its direction being nearly due West.

"The loss of boats on the Ganges near this has been very great, but the Indigo has sustained no damage, the greater portion being too small to receive hurt."

Report from the station of Furrceepore, Jessore, Lat. $23^{\circ} 36\frac{1}{2}'$ N.; Long. $89^{\circ} 51'$ East.—By T. B. MAC TIER, Esq. C. S.

For several days preceding the storm, the weather was exceedingly stormy, and during the 14th, there was a good deal of wind which however, died away, and in the evening it was exceedingly sultry with a very threatening sky. I may here observe that for three days previous to the storm the prevailing winds were Easterly! About 9 P. M. a moderate breeze sprang up from East which veered Northwards, and at 11 P. M. the wind was N. N. E., it then went back again gradually increasing in violence until it reached S. East which it did at 7.30 A. M. (15th) when it was at its greatest height, it then went Southwards, gradually decreasing in strength and died away to a moderate breeze about 6 P. M. (15th) at which hour the wind was W. S. W.

The Barometer and Thermometer stood as follows:—

	Bar.	Ther.
15th.— $\frac{1}{2}$ p. 6,	29.154	79.8
$\frac{1}{2}$ p. 7,	29.134	79.2
9,	29.176	78.4
$\frac{1}{2}$ p. 10,	29.258	78.4
$\frac{1}{2}$ p. 5,	29.474	79.4

The damage done to houses and trees was very great, but it did not appear so violent as the storm which visited the Bancoorah district in April, 1850, an account of which I think sent you.

From the native accounts, the storm was most severe between this and Dacca, and in Pergunnah Vikrampūr near the junction of the Kirtinassa and Megna, the sea is said to have rolled over the land in a wave $7\frac{1}{2}$ feet high. I am doubtful of this however.

Report from Rampore Bauleah, Lat. 24° 22½' East; Long. 88° 38' East.—By J. R. BEDFORD, Esq. Civil Asst. Surgeon, H. O. S.

On the 14th.—At 4 P. M. the Barometer stood at 29.644; at 4h. 30m. P. M. a South-Easter came up in one heavy roll of steam-like clouds which hung low, and occupied but half an hour in travelling from one visible horizon to the other. It was accompanied by a stiff gale.

At 12 at midnight the Cyclone began from N. E. veering to N. at 2 A. M. of 15th; and between that and 7 A. M. to N. W. It travelled round to W. as the day advanced and blew from S. at 9 P. M.

I was unable to note the Barometer until 7 A. M. from which time its hourly uncorrected reading was as follows:—

Hour.	Newman's Standard Barometer.	Attached Thermometer.	Direction of wind.
7 A. M.	29.240	77°	N.
8	.214	77	N.
9	.140	77	N.
10	.066	77	N.
11	.036	77	N.
12	.088	77	N.
1½	.232	78	N.
2	.276	78	N. W.
3	.320	79	N. W.
4	.354	79	N. W.
5	.428	79	N. W.
6	.480	79	N. W.

The wind's force began to diminish simultaneously with the rise of mercury but blew with a force of 6 (Admiralty symbol) as late as 6 P. M. At 9 P. M. it had veered to South and was very moderate.

Throughout the gale the sky was one mass of nimboïd cloud. The total fall of rain during the 24 hours of its continuance, was 3.35 inches. No thunder was heard or lightning seen, but the noise of the gale and density of clouds were sufficiently great to have masked either one or the other.

About 150 huts have been destroyed, but as far as I am aware there has been no loss of human or animal life on land in this neighbourhood.

The destruction of property appears to have been much greater in the Southern and Eastern part of the zillah.

Report from Jeypoor Bogoorah, Lat. 25° 15' N.; Long. 89° 03' E.—By J. W. PAYTER, Esq.

May 14th.—9 P. M. till midnight wind strong from the East, gradually increasing.

15th.—2½ A. M. wind rising rapidly to a gale at 5 A. M.; at 6 A. M. a perfect hurricane from the N. N. E. and continuing without intermission in gusts till 2½ P. M. with continued rain in sheets—at the latter hour it moderated and the rain ceased; people in the villages peering out to see the extent of their own and neighbours' losses, but there was not much time afforded for examination, for by 4 P. M. the wind had again got up in the opposite quarter W. N. W.; and at 6 P. M. was as furious as before till 9 P. M. when it began to subside, until 10½ P. M. when it settled into a steady light breeze from S. E.

16th.—Cloudy, with the same Southerly wind till 9 P. M. when we had another storm (without rain) from the S. West.

17th.—The sky still very cloudy, country deluged with the rain water.

Report from Bancoorah, Lat. 23° 14' N.; Long. 87° 05' East.—

By G. N. CHEEK, Esq.

As we are having a gale I send you the particulars of what has occurred here. On the 13th May, P. M. I find in my note book, the following remark: "I shall not be at all surprized again to have a May gale," on the morning of the 14th we had East winds in rather strong puffs, which had been the case during the night of the 13th. 3 P. M. 14th, wind strong in puffs, with occasional showers and heavy masses of clouds going to the West; wind at 3 P. M. E. N. E.; since 5 P. M. the wind shifting about S. E. to S. W. 9 P. M. wind at West, with very slight drizzling rain and wind in puffs. 15th, wind shifted on the night to W. and N. W. with slight rain in the morning, and blowing hard to the W. a little inclining to N.; half-past nine clearer but wind appears on the increase, wind continued till near 2 strong at times from W. b. N., with heavy clouds. 3, wind lulled and the sun came out, wind rose again at 3½ with dark clouds to the North-West; about 4, it was quite calm with clouds and very close.

I am of opinion there has been a severe storm in Lower Bengal, and although we had but little here, it may help you, even though what I write may be of little worth.

Report from Dinagapore, Lat. 25° 37½' N.; Long. 89° 40' East.—

By G. YULE, Esq.

On the evening of the 14th inst. a heavy bank of clouds was seen rising in the South-East, the rest of the sky being clear. During the night a

moderate breeze arose accompanied by light rain and continued till nearly 7 A. M. of the 15th, when it lulled for an hour and then commenced blowing from the North-East and rapidly increasing in strength as it veered round to the North-West till 3 P. M., at which time it began to moderate, and it ceased almost entirely as it became nearly due West about 6 P. M. Below are the registerings of an Aneroid Barometer of which, unfortunately no note was taken till noon of the 15th, when it was observed to be rapidly falling. Of two common Barometers at the station, one fell to 28.90 the other only to 29.20.

15th noon, Aneroid 29.30

2 P. M. 29.17

3 ditto. 29.14

3½ ditto. 29.11 this was the lowest, and after rising some time

6 ditto. 29.16 here a very slow rain commenced.

c Notes from Chilacall, 15 miles N. of Rungpore Civil Station.—

Lat. 25° 52' N.; Long. 89° 39' E.—By T. SANKEY, Esq.

May 15th, 1852.—At sunset last night a heavy bank of clouds rising in the S. W.; commenced raining at 8 P. M., continued all night with Easterly wind blowing hard and in gusts; at daylight rain and ditto wind.

8 A. M. Ther. 78½° Bar. 29.51

Noon .. .45 Wind N. E. and heavy squalls.

1 P. M. .. .34

2 ditto .. .25 Wind shifting to N. in terrific gusts.

2½ ditto 76 .23

2¾ ditto .. .21 N. by E.

3 ditto 75 .15

3½ ditto .. .12

5 ditto .. .16 The gusts somewhat less violent.

Dusk .. .19

7 P. M. .. .23

8 ditto .. .36

9 ditto .. .41 Wind going down, succeeded by torrents of rain.

9½ ditto .. 29.45 Squally.

Storm ceased about midnight.

16th May.—Daylight Bar. 29.55 .

2 P. M. .63 Ther. 86.

14th May.—2 P. M. 29.67 86

5 ditto .58

Report from Gowalparah, Lower Assam, Lat. 26° 11½' N. ; Long. 90° 37' E.—By W. POLLOCK, Esq. to Col. JENKINS, Agent Govr.-Genl.

The gale commenced here on the morning of the 15th, at 11 A. M. the sky looking exceedingly cloudy and dark from the Eastward, with the wind from the N. E. and gradually increasing in violence till 2 P. M. when it blew a perfect hurricane, and just about that hour the roof was completely blown off the bungalow usually occupied by the officer commanding the Detachment here, but most fortunately no person was in the house at the time. The wind continued from the same quarter accompanied with heavy rain till 4 P. M. when the gale somewhat subsided and the sky looked clear, but in about an hour afterwards the wind commenced to blow stronger than before, but shifted its course from N. E. to N. N. E. and continued strong and steady till 1 A. M. on the following morning (Sunday) when the wind suddenly veered round to the Southward and soon afterwards to the S. W. ; the gusts from the S. W. were really awful, and continued with but little intermission till 3 P. M. when the gale gradually subsided. I regret to say that four or five men were drowned in attempting to cross the river, and about forty boats lost, containing a large quantity of salt, rice, &c. &c. the property of the Kyens in the bazar. The most remarkable feature in the storm was its continuing so long and so strong, and so suddenly shifting its course from the N. E. and N. N. E. to the S. S. W. *The gale was not accompanied by thunder or lightning.* The quantity of rain which fell was 3½ inches.

I am sorry to say we have no Barometer at the station, the Thermometer ranged from 74 to 78°, and the weather for the last four or five days has been exceedingly warm. The Ther. 90° in the shade and 128° in the sun at 4 P. M.

Notes of the Gale at Gowhatty, Lat. 26° 10½' N. ; Long. 93° 46' E.—By Lt.-Col. JENKINS.

14th.—A close and sultry day, sky covered with thin dark clouds, which partially obscured the sun.

At sunrise, Barometer	29.578
9h. 40m.	.596
12 P. M.	.572
2h. 40m.	.479
4 P. M.	.456
Sunset,	.492
Sunrise, Thermometer	78.3
Noon,	82.5
Sunset,	83.5

Prevailing wind N. E.

15th.—Very dark and lowering sky, stormy-looking clouds in dark ragged masses. A shower about 5½ A. M., wind from N. E. After 10, wind began to rise, and from 12, blew a gale with heavy rain (which commenced at 1) from the N. E.

Night stormy and wet.

At sunrise, Barometer	29.450
9h. 50m.	.462
Noon,	.427
2h. 40m.	.419
4 P. M.	.380
Sunset,	.320
Sunrise, Thermometer	78°9
Noon,	79.7
Sunset,	78.

No serious damage done by the gale.

Barometrical Observations from Nursingpore in Central India, Lat. 22° 57' N.; Long. 79° 38' bearing about W. $\frac{3}{4}$ S. from Calcutta.—*
By C. G. E. FORD, Esq.

Some atmospheric perturbation at this station appears to have preceded the Cyclone in Calcutta, as the Barometers suffered some considerable depression on the 12th and 13th, being at Noon on the

11th	28.680
12th	.685
13th	.664
14th	.651
15th	.662
16th	.671

But we can scarcely suppose from the track of the storm that it was in any way connected. To the Eastward on the Coast of Arracan the Barometer does not appear to have been affected either before or during the Cyclone.

I now proceed to give as usual in these Memoirs, the comparative Tables of wind and weather on the different days in which the Cyclone was felt in various parts of the Bay and on its inland progress.

* Its elevation above Calcutta, I am unable to give.

Comparative Table of Winds and Weather, from the 12th to the 15th May, 1851. Sunderbund Cyclone.

<i>Date.</i>	<i>Name of Ship or Station.</i>	<i>Lat. North.</i>	<i>Long. East.</i>	<i>Winds and Weather.</i>	<i>Bar.</i>	<i>Symp.</i>	<i>Ther.</i>	<i>Remarks.</i>
1852. 12th May.	Amazon,	16° 41'	85° 07'	8 p. m. gloomy. Noon threatening to mid- night.	Midnt. 29.68 65	29.54 46	86° 86	Lightning to S. Eastward. Confused sea getting up at midnight.
	London,	16.40	90.00	Wind S Westerly and at midnight North. A. m. Wind variable. Noon N. East; 4 p. m. N. East. 6, p. m. heavy gales with violent squalls. 10h. 30m. Hurricane. North.	.. ..	..	..	Ship running to S. W. to 6 p. m. Heavy sea. Hove to.
13th May.	Eneas,	15 38	85.42	W. S. W. to W. N. W. Overcast Aneroid.	29.75 29.62	29.72	87°	Much lightning all round particularly to S. Easterly, Westerly swell.
	Limehouse,	16.42	86.36	A. m. W. N. W.; p. m. West, strong breeze increasing throughout.	29.785, ..	..	82	Heavy head swell. Mid- night blowing very heavy. Ship running to the North- ward.

Date.	Name of Ship or Station.	Lat. North.	Long. East.	Winds and Weather.	Bar.	Symp.	Ther.	Remarks.
13th May.	Amazon,	17° 21' N.	85° 49' E.	A. M. N. N. W. increasing; Noon N. W. P. M. N. W. West and S. W.	4 A. M. 29.57 Noon .57 4 P. M. .40 10, 50 Mid. 48	29.40 .42 .30 .38 .36	85° 89½ 83 83½ 84	Threatening from sunset of the 12th. Noon high tumbling sea. Terrific squalls; kept away to S. E. to avoid Cyclone. Midnight hove to.
	London,	No observations.		Hurricane; 4 A. M. N. West; 9 A. M. West; 11 A. M. W. S. W.	..	..	..	2.30 A. M. lost mizen-mast and cut away main-mast. Hurricane to midnight.
	Adelaide,	19.27	86.15	Noon North; P. M. increasing to a gale; 8 P. M. heavy gale N. N. W.; Midnight N. W. b. W.	Noon 29.57 Midnt. 29.39	Noon 29.25 Midnt. 29.10	86 86	Noon head swell. P. M. the same from Eastward. 8 P. M. bore up to run out of the Cyclone. Running to the S. b. E.
	Precursor, Steam Vessel,	15.28	83.01	Heavy dull weather, light North and N. East wind, veering to East and S. East.	6 P. M. 29.68	6 P. M. 29.41	88	Swell from N. W. making preparations for bad weather.
	FALKE POINT LIGHT HOUSE.	20.19½	86.44	Wind N. East to N. W. at midnight.	29.70	..	86	Squally with cross sea flying, and falling Barometer.

Balalore,.....	21° 28'	87° 00'	S. E. slight rain, cloudy to E. S. E. and E. N. E.	..	..	92	
H. C. F. L. V. Star, Eastern Channel,.....	21.4	88.14	P. M. wind E. b. N. gradually increasing.	..	..	..
H. C. P. V. Sal- ween,	20.56	88.05	Fresh Easterly breeze. Midnight E. N. E.	29.69 to 29.56	..	85 to 86	At anchor in the South Channel. Midnight parted. S. Channel Buoy, W. $\frac{1}{4}$ N. 3.
H. C. P. V. Saugor, Pilot Ridge Station.	20.49	87.49	Daylight threaten- ing. Noon strong E. N. E. breeze. Mid- night hard gale N. East.	29.61 to .66 and .53	..	83 85 83	Riding with 210 fs. cable.
H. C. F. L. V. Hope, Gasper Sta- tion.	21.26	88.04	8 A. M. fresh Easterly winds. Midnight E. N. E.	29.58 Midnight.	..	..	Heavy sea by midnight.
Easurain, .....	..	..	Wind E. N. E.	29.70	..	..	At anchor off Saugor Flat Buoy, E. S. E. $\frac{1}{4}$ a mile off.
CHANDERNAGORE,	22.51	88.29	A. M. Northerly dur- ing the day variable E. N. E. to S. East.	29.68	..	..	Sun rose, very pale, ap- pearing like a large moon.
Katgoorah,.....	23.16 $\frac{1}{2}$	88.57	A. M. heavy clouds to South, wind S. E.	..	..	..	Strong S. Eastly breeze throughout.

Date.	Name of Ship or Station.	Lat. North.	Long. East.	Winds and Weather.	Bar.	Symp.	Ther.	Remarks.
14th May.	Eneas,	17° 49'	87° 05'	W. b. N. to N. W. more from W. N. W.	A. M. 29.62 P. M. 55	29.66 .55	85.0	Aneroid A. M. 29.55. P. M. 29.45; 9 P. M. a short sea from N. Eastward felt. Sheet lightning all round.
	Limehouse,	17.09	86.20	2 A. M. heavy gale West; 5 A. M. S. W. P. M. W. S. W.; 8 P. M. West; midnight W. b. S. heavy gale.	Noon 29.685 7 P. M. .560 10 P. M. .450	29.30 .. .10	82 80 79	2 A. M. hove to, terrific squalls; 6, bore up heavy cross seas. 10 P. M. hove to again. Incessant lightning.
	Amazon,	16.50	87.13	6 A. M. S. W. P. M. W. S. W.; 4 P. M. S. W.	29.64	29.56	82	6, Moderating a little but terrific squalls at 7 A. M., P. M. bore up. 4 P. M. Gale much diminished.
	London,	16.41	89.40	4 A. M. more moderate W. S. W.; latterly wind S. W.	..	..	..	Ship dismasted and water-logged. Abandoned on the 16th in Lat. 17° 35' N.; Long. 90° 40' East.
	Adelaide,	18.45	87.23	A. M. N. W. b. W. heavy gale; 4 A. M. N. W.; 5 A. M. W. N. W.; 9 A. M. West. P. M. hard gale.	29.34	29.00	81	Ran to S. b. E. and S. East, and hove to.

14th May.	Precursor Vessel,	17° 46'	84° 48'	Squally and dark from N. W. to North and S. East. P. M. veering to S. W. and West and S. S. W. fresh gale at times.	From 29.63 to Noon 29.65 and P. M. 29.70	29.50 .54	..	Reduced speed at 4 A. M. to avoid the Cyclone. Heavy bank and swell from N. East Set of 65' to the East from noon 13th. Stood back to the S. East at 9 P. M.
	False Point, Light House,	20.19½	86.44	N. W. Noon North; 5 P. M. S. East; 6. S. S. East. Midnight West.	29.52 to 38 and .50	..	..	Steady gale from N. W. to Noon. Gale broken at 6 P. M. Wind S. S. East. Confused sea in the offing.
	Balasore,	21.28	87.00	A. M. N. E. Noon North. Stiff breeze N. N. W.; 6 P. M. N. W. Midnight W. N. W. and W. S. W.	29.45 2 P. M. .36 5 P. M. .29 Mid.33	..	..	Heavy dense bank of clouds to the E. N. E.
	H. C. F. L. V. Star,	21.04	88.14	Blowing a hurricane veering to N. W. at Midnight.	..	..	..	Barometer stated to have fallen to 28.36!
	H. C. P. V. Cavery,	20.49	..	A. M. fresh gale N. E. to East, increasing to a hurricane from N. N. W. to N. West. P. M. N. W. to West; 8 P. M. W. N. W.	29.54 to 28.64 and 29.50	..	..	Standing to sea from Pilot's ridge station. 12 P. M. Cut away mainmast. Barometer rising from 2.30 P. M.

<i>Date.</i>	<i>Name of Ship or Station.</i>	<i>Lat. North.</i>	<i>Long. East.</i>	<i>Winds and Weather.</i>	<i>Bar.</i>	<i>Symp.</i>	<i>Ther.</i>	<i>Remarks.</i>
14th May.	H. C. P. V. Salween,	From 20° 05' to 20.10	88° 05' 88.06	Daylight gusty N. E. Noon hurricane N. N. E. by 6 P. M. West. Midnight W. S. West moderating.	29.50. to 28.72 29.50	80	85	Standing to S. East, and hove to at 8.30 A. M.
	Saugor P. V. Pilot's ridge.	20.49	87.49	Hurricane E. N. E. to N. E. Noon N. E. 4 P. M. N. b. W. Midnight N. West and fast abating.	29.48 to 28.96 and 29.28	..	83 80 81	Rode out the gale on the Pilot's ridge with 210 fms. of cable.
	H. C. F. L. V. Hope. Gasper Station.	21.26	88.04	Daylight strong N. E.; 11, gale at N. E. to Noon N. E.; 8 P. M. N. b. W.; at 9, N. W. b. N. Midnight hurricane.	29.60 to 28.98 and 29.70	..	..	Vessel driving at 8 P. M.; Bar. lowest at 8 P. M.
	H. C. B. V. Grasper,	At Saugor	..	A. M. fresh E. N. E.; 8, heavy E. N. E.; Noon gale N. E.; 4, N. N. E.; 8, North. Midnight North.	29.78 to 29.72	..	..	At midnight, gale still increasing.

Easurain, .....	..	..	A. M. N. East squally; 10 P. M. to midnight hurricane from North in terrific squalls.	29.60 to 29.40 and 29.08	..	..	At anchor as before. Saugor Flat Buoy.
Diamond Harbour,	22° 11' 4"	88° 12' 4"	From Noon to 6 P. M. blowing violently from East to midnt.	29.45 at 7 P. M.	..	..	Report imperfect.
P. and O. S. N. Garden Compy's Ship Reach, Hindostan,	Garden South of Calcutta.	..	Noon E. N. E. Midnight North.	29.58 Noon 29.03 Midnt.	88°	..	..
CALCUTTA,	22° 34'	89° 22'	Daylight fresh breeze N. E. Noon E. N. E. and N. E. 5 P. M. N. N. East; Midnight about North, hard gale.	29.74 to 29.17	..	85	A. M. heavy bank, East to N. East.
THE SUNDERBUNDS; Berham-pooter Steamer.	21.54	89.02	4 A. M. strong Easterly winds to Noon; 4 P. M. E. S. E. increasing. Midnight hurricane, S. S. East.	..	..	82	5.30 P. M. every appearance of a gale, ran into creeks for shelter, 2 anchors down. Midnight drove on shore.
THE SOONDERBUNDS; Chunar Steamer. ....	..	..	From 5 A. M. increasing Easterly breeze; 10.40 A. M. E. N. E. 10 P. M. East gales and terrific squalls, veering South Easterly.	..	..	..	Midnight hurricane, boats swamped, and vessel on shore in the jungles.

Date.	Name of Ship or Station.	Lat. North.	Long. East.	Winds and Weather.	Bar.	Ther.	Symp.	Remarks.
	CHANDERNAGORE,	22° 53'	88° 20'	A. M. wind E. N. E. squally and passing showers; 7.30 P. M. N. E. increasing; 11 to midnight N. N. E.	From 29.50 to 29.47 and 29.00	..	..	Increasing from 7.30 P. M. to strong gale with heavy and frequent squalls.
	KISSENUNGUUR,..	23.26	88.35	Variable N. to East; 10 P. M. E. N. E. blowing fresh and strong squalls. Midnight North furious gale.	..	..	..	..
	KATGURRAH FAC-TOREY,	23.16½	88.57	Strong breeze from the East all day; 7½ P. M. increasing; 11 P. M. hurricane. Midnight wind N. E.	..	..	..	..
	RAMPORE BAH-LEAH,	24.22½	88.36	4.30 P. M. A South Easter followed by a stiff gale. Midnight Cyclone commenced from N. East.	29.64 4 P. M.	..	..	..
	JEPPORE Bogo-BAH,	25.15	89.03	9 P. M. till midnight strong increasing Easterly breeze.	..	..	..	..

14th May.	BANCOORAH,	23.14	87.05	3 P. M. wind in strong puffs from E. N. E.; 5 P. M. wind S. East to S. West; 9 P. M. West.	..	..	..	Night of 13th, Easterly winds in puffs. P. M. 14th May, light drizzling rain.
	DINAGPORE, ...	25.37½	87.40	Evening a heavy bank of clouds coming up in the S. East. Night moderate breeze and light rain.	..	..	..	..
	GOWAHATTY, AS-SAM,	26.10½	93.46	Prevailing wind N. East.	29.57 to 29.49	..	..	Close sultry day.
15th May.	Ennas,	Pilot Station.	..	S. W. and South.	29.73	29.73	86°	1 A. M. sea increasing very fast, ship standing out to the Eastward about 60' to get an offing. Sea high from Northward latterly.
	Limehouse,	17.59	87.22	S. W.; 8 A. M. S. W. b. W. Noon S. W. more settled.	29.83	29.30	83	Barometer rising and falling to the weather; 8 A. M. Bore up. Confused sea.
	Adelaide,	19.27	87.12	A. M. S. W. decreasing gale.	29.58	..	..	Noon fine and strong breeze. Set of 48 miles to the W. b. N.

Date	Name of Ship or Station.	Lat. North.	Long. East.	Winds and Weather.	Bar.	Symp.	Ther.	Remarks.
15th May.	Precursor Steam Vessel,	19.31	87.10	A. M. strong S. S. Westerly breeze. Sea going down.	29.76	29.62	86'	Noon standing on full speed.
	BALASORE,	21.28	87.00	6 A. M. S. W. finer breeze and pleasant.	29.50	..	83	..
	F. L. V. Star, ..	20.55	..	A. M. hurricane from N. W.	..	..	..	In 25 fms. water to the W. S. W. of the station.
	Easurain, .....	..	..	A. M. gale N. N. W. heavy sea. 3 A. M. W. N. W. Daylight W. S. W.	1 A. M. 29.20 29.20 29.40	..	..	Driving from Saugor Flat Buoy on shore; at 2 A. M. at Saugor Point.
	H. C. B. V. Grappler, Saugor, .	..	..	From 1.30 to 2.30 gale at its height. 2 to 20 N. N. W.; 10.30 S. S. West moderate and fine.	29.21 to 20.20 and 29.70	..	..	5 A. M. gale moderating fast.
	A. C. F. L. V. Hope, Gasper Station,	21.26	88.04	1 A. M. W. N. W.; 2 to 4, moderating.	29.38 to 29.70 at 8 A. M.	..	..	Gale moderate at 5 A. M.

15th May.	DIAMOND HAR- BOUR,	22.11½	88.12½	1 A. M. N. N. W. hurri- cane to 4 A. M.; 6 A. M. West.	29.54 to 29.55	..	83°	Report imperfect.
	P. and O. C. S Hindustan, Gar- den Reach, ....	..	..	2 A. M. N. W.; 4, West to W. N. W.; Noon W. b. N.	28.84 to 29.48	..	75	Force of wind not given.
	CALCUTTA,	22.34	88.22	4 A. M. wind N. Westerly; 7 A. M. West.	28.82	29.28	81½	Towards Noon decreasing to fine weather.
	THE SUNDER- BUNDS, BAGUN- DEE.	22° 38'	88° 57'	Gale at E. N. E. but veering fast to the Southward.	..	..	..	At 2 15 A. M. lull for about ten minutes and shift from E. b. S. to S. West.
	THE SUNDER- BUNDS, BEE- HAMFOOTER STR.	21.54	89.02	Hurricane from S S. E.; 2.45, veering to the Westward.	..	..	..	Vessel driven on shore.
	THE SUNDER- BUNDS, CHUNAR STR.....	..	..	0.30 A. M. wind veer- ed to South; 4.30, still violent; 6, S. E. moderating.	..	..	..	Vessel on shore, 7.30 got off.
	CHANDERNAGORE,	22.53	88.20	A. M. North; 3, N. W.; 5, W. N. W.; 8, West. Noon W. S. W.	29.90 3 A. M. .65 Noon 29.37	..	..	Increasing in violence; at 3 A. M. a fierce hurricane. At 5 moderating to Noon.

<i>Date.</i>	<i>Name of Ship or Station.</i>	<i>Lat. North.</i>	<i>Long. East.</i>	<i>Winds and Weather.</i>	<i>Bar.</i>	<i>Symp.</i>	<i>Ther.</i>	<i>Remarks.</i>
15th May.	KISSENVUDDUR,...	23° 26'	88° 35'	At 4 A. M. about N. N. W.; 6 A. M. Wind W. N. W.	..	..	..	Hurricane at its height from 2 to 4 A. M. moderating from sunrise.
	KATGOREAH FACTORY,	23.16½	88.57	1 A. M. tremendous gale N. E.; 5 A. M. slight lull and veered by North to West; 9 A. M. moderating; 3 P. M. wind high from S. W.	..	..	..	At 1 A. M. trees and houses falling in all directions.
	MAIDA,	25.03	88.04	6 A. M. strong gale N. N. E. and rain; 8 A. M. increasing N. by E.; Noon due North. 3 P. M. N. N. W. moderating to 5 P. M. when wind West.	..	..	..	..
	FURREEDPORE, ..	23.36½	89.51	7.30 A. M. S. Easty. gale, veering South-erly.	29.154 to .134 and .474	..	79.8° 78.4 79.4	Gale at its greatest height at 7.30 A. M. On the 14th, moderate breeze, Easterly and N. N. East.

15th May.	RAMPORR LEAH,	24° 22½'	88° 36'	A. M. wind from N. E.; 2 A. M. North to 1½ P. M. 2 P. M. N. West; P. M. West; 9 P. M. South.	29.240 7 A. M. 29.636 11 A. M. 29.46 6 P. M.	..	..	..	..
	JEPPOOR, Bogo- RAH,	25.15	89.03	2½ A. M. rising rapidly to a gale. 6 A. M. hurricane from the N. N. E.; 2½ lull; 4½ wind W. N. W.; 6½ hurricane till 9 P. M.; 10, light breeze S East.	..	..	..	Rain in sheets during the gale.	..
	BANCOORAH,	23.14	87.05	Wind shifting in the night to W. and N. W. slight rain, wind veering by West to North. 4 P. M. calm.	..	..	..	..	..
	DINAGAPORE,	25.37½	89.40	7 A. M. lulling for an hour and commenced blowing from the N. to East, veering to N. W. by 3 P. M. when moderating.	Aneroid 29.30 to 29.11	..	..	Gale of no extraordinary violence.	..

Date.	Name of Ship or Station.	Lat. North.	Long. East.	Winds and Weather.	Bar.	* Symp.	Ther.	Remarks.
15th May.	CHILLAKHAL, BUNGPORE, ..	25° 52'	89° 37'	A. M. Easterly wind in hard gusts. Noon N. E. and heavy squalls. 2 P. M. North terrific gusts; 2 1/2 N. b. E.; 5 P. M. moderating.	29.51 to 29.16 and 29.45	..	..	Sunset 14th, heavy bank of clouds to the S. West. Storm ceased about midnight of 15th.
	GOWAIPARA, As- SAM,	26.11 1/2	90.37	11 A. M. N. E. East, increasing to hurricane at 2 P. M.; 4 P. M. moderating but renewed at N. N. E.	..	..	..	1 A. M. 16th, veered to South and S. W. blowing a hurricane with gusts, and moderating at 3 P. M.
	GOWHATTY, As- SAM,	26.10 1/2	93.46	A. M. N. E. Noon gale to midnight.	29.45 to 29.32	..	78° to 79	

PART II.—REMARKS.

I now proceed to detail the considerations from which the tracks of the Cyclones are laid down, and to add a few remarks on the phenomena of the principal one.

On the 12th May.—We have, first, the unfortunate ship *London* with a fresh N. East breeze, to which she could just carry her main top-gallant sail, running $8\frac{1}{2}$ knots to the S. W. or in the N. W. quadrant of her Cyclone, which before midnight was a tremendous hurricane obliging her to heave to at 10 hours 30 minutes P. M. when the wind was veering to the Northward and N. West, so that the ship in the 80 or 90 miles of run which she had made to this time had crossed in front of, and forced herself close in towards the centre; and at 2.30 A. M. of the 13th, lost her mizen mast by one of the terrific squalls from Northwest, which she would of course find there. If we allow the wind to have been North at 40 30 P. M. when the ship hove to, and that the centre then bore East from her at a distance of 25 miles; the most we can allow, seeing how rapidly the wind veered with her from this time; this will place it at this hour (10.30, P. M. 12th) in Lat. $15^{\circ} 7'$ N. Long. $89^{\circ} 20'$ East, and if it was the same Cyclone as that which afterwards passed up over the Sunderbunds, it was travelling up at the rate of eight miles an hour, since it passed the station of Bagundee (see p. 425) at 418 miles N. $\frac{1}{2}$ West distant from this position at 2 30 A. M. of the 15th, which gives an interval of 52 hours. None of the other ships were near enough at this time I should consider, to feel the effects of the Cyclone as to wind, though the sea and gloomy weather and their Barometers were all giving warning on the following day.

13th May.—We have on this day the *Precursor* Steamer though far to the Westward, and the *Eneas* on the same parallel, but three degrees farther to the Eastward with gloomy and threatening indications sufficient to induce them, very properly, to make due preparations, and farther to the Northward we have the *Limehouse* with a heavy head sea and the wind (not marked at Noon but before it, W. N. W. and P. M. West) about W. by N. the gale constantly increasing. The *Amazon* to the N. W. of her has at noon strong breezes from the N. W. with torrents of rain and finally so many indications of a Cyclone to the N. East of her, that she is very properly kept away to the S. S. E. to avoid the centre. The winds of both these ships were probably influenced by the vicinity of the shore and by the monsoon, to which, also the high Barometer of the *Limehouse* may be owing; and if we admit the *London's*

Cyclone, which was an undoubted one, to have been the Cyclone which travelled up to the Eastward of the Light vessels and over Bagundee, and this appears to me to be its probable track—we shall be unable to reconcile any centre upon this track, taking also the known rate of travelling which we have assigned above with these ships' positions and winds.

I have therefore assumed that there were on this day, and for part of the 14th, two Cyclones, the main one being the *London's*, which certainly was, during the whole of this day, a furious tempest with that ship, passing off at a moderate rate of progression to the Northward; and the smaller one being that indicated by the winds of the *Amazon* and *Limehouse* only; of which the centre seems to be in Lat. N. $17^{\circ} 49'$ Long. $86^{\circ} 38'$ and being of so small an extent that it did not reach the position of the *Adelaide* on this day at noon. And there is nothing new in this assumption for we know, that these in-shore Cyclones hereabouts, while larger and heavier and perfectly formed ones are blowing in the Bay, are quite common. It would seem indeed that as in a former instance (XXIII. Memoir, Journal, Vol. 23rd, p. 505) the minor of the two Cyclones, or in other words the absorption of the small one into the larger, occasioned some disturbance in the regularity of the wind at False Point Light House, for we find that there were not only two distinct scuds S. East and S. W., but that moreover the wind veered from East to North settling to a steady gale at N. W. till noon of Friday the 14th, when it changed to North, and at 5 veered again to S. East breaking up at 6 P. M. in a S. S. E. and finally a Westerly breeze.

For the main Cyclone on this day we have no other position than its calculated distance on the line of track at eight miles per hour which will place it in Lat. $17^{\circ} 25'$ N. Long. $89^{\circ} 15'$ East, and we shall see also that this line of track and rate of travelling agrees on the 14th, with the times and direction of the winds experienced by the Floating Light Vessel, and *Salween*, P. V. at the Sand Heads.

14th May.—If we take for this day on the line of the main or *London's* Cyclone, the same rate of travelling as before, viz. six miles per hour, for the twenty-four hours, we shall find that the centre falls on a spot in Lat. $20^{\circ} 38'$ N. Long. $89^{\circ} 03'$ East or forty-four miles to the S. East of the Floating Light Vessel's station, and that this position with the line of the track which we have assumed, agrees with the rapid veering of the wind after Noon of this day as shewn by the capital Log of the H. C. P. V. *Salween*. It also agrees with the wind at Calcutta, at Saugor, Balasore, False Point and the Pilot Vessels on the Ridge, but it does not appear to have reached so far as the position of the *Adelaide*

on its S. Western quadrant which ship, up to noon this day, had evidently sheered round the Western and Southern quadrants of the in-shore and smaller Cyclone as will be seen by the rapid veering of the wind with her. And the proximity of it to the large one fully accounts for the oscillation of the *Adelaide's* Barometer so well and so carefully observed by Capt. Stephens. We have also to take into account here that the S. W. monsoon which was blowing strongly along the coast was adding its force to this quadrant of the Cyclone. The distance, and the bearing of the centre of the main Cyclone, would give the *Adelaide* at most a moderate gale at N. W. or one of no greater strength than the strong squalls and puffs experienced at Calcutta at the same distance North of the centre at this time, whereas we find her with a hard gale at W. S. W. reducing her to storm trysails and evidently a part of the in-shore Cyclone as marked.

On the 15th May. We find the centre of the main Cyclone reaching Bagundee at 2h. 15' A. M. on this day, and passing over the Station House with about two minutes' lull; so that we may say that the true centre was at Bagundee at about 2h. 20' A. M. an interval of (14h. 20') fourteen hours twenty minutes, since Noon of the 14th; which at eight miles an hour would give about 115 miles. The distance measured on the Chart is about 120 miles, and this position and rate of travelling will also be found to agree, almost exactly, with the winds experienced by the Floating Light at the Gasper Station and by the Grappler Buoy Vessel at Saugor.

But in advancing inland to the N. b. East from Bagundee the Cyclone seems to have increased its rate of travelling, though in some degree to have moderated its fury; for, passing over the Katgorrah report which being only at thirty-eight miles distance and the exact time of the passage of the centre not being ascertainable from the brief notice which we have from that factory, we have fortunately from Mr. Payter at Jeypoor to the N. N. W. of Bogorah very clear and sufficiently exact data to enable us to say that the centre passed there about 3 P. M. of the 15th, which would give 12 hours and 40 minutes for the elapsed time, since its passage over Bagundee at 2h. 20' A. M., the measured distance between these two positions being 148 miles; which will give 11.7. or eleven miles and three quarters per hour as its inland rate of travelling, while as we have seen it was only eight miles when at sea. It is thus an instance, and I think a solitary one, of a Cyclone *augmenting* its rate of travelling when it reaches the land. Was this owing to the junction of the smaller in-shore Cyclone of the *Limehouse* and *Amazon*?

We have no data which will enable us to follow the centre accurately

farther to the Northward and Eastward, though there is no doubt that it was felt severely in the district of Rungpore, and Eastward into Assam, but I have not carried the track beyond Jeypoor Bogorah on the Chart. I have however measured back from that station over which the centre passed at 3 P. M. 35.2 thirty-five miles, being the distance, at 11.7 miles per hour, of the centre South of Jeypoor at Noon, for its position on that day, which it will be seen falls in Lat. $24^{\circ} 28'$ N. Long. $89^{\circ} 03'$ East, giving a N. N. W. wind at Rampore Bauleah and an E. N. E. one at Chilakhal which taking into account the vicinity of high lands and the known irregularities of shore-winds are near enough* for inland reports. The singular fact related in Mr. Cooper's Jessore report of the fall of the trees in opposite directions on an East and West road, whereas the track of the Cyclone was nearly North and South, is a beautiful exemplification of the puzzling shifts of wind which so much embarrassed our forefathers.

PART III.—OF OTHER PHÆNOMENA.

Thunder and Lightning.—The question of the Thunder and Lightning experienced in any part, or at any time, of a Cyclone is always one of much interest. We find that the *Eneas*, *Limehouse*, *Amazon*, *Adelaide* and *Precursor* had all lightning more or less; the *Limehouse* indeed had it of an excessively vivid description, but whether this occurred when the disturbance occasioned by the junction of the two Cyclones took place, we cannot exactly affirm. In the Bagundee report, Mr. Crank, distinctly states that there was no thunder or lightning, nor is there any particularly noticed in any of the inland reports, except from Malda where the lightning was seen at a distance, and the absence of it is also specially stated from Rampore Bauleah.

EARTHQUAKES.

There is no room, I should think, to doubt that Mr. Crank has fully established for us that in this instance at least, and at the centre of the Cyclone, earthquake shocks were experienced; his peculiar situation in being with his family in a small brick built edifice intended for a pig-stye and his frequent experience of earthquakes in other parts of the world† give us the best assurance that he could not be mistaken, as persons residing in houses of one or

* There is some discrepancy in the Rampore Bauleah report, and the tale at the foot of it which I cannot reconcile.

† This is more important than would be supposed: I have also lived some years in earthquake countries and can usually distinguish shocks much sooner than persons who have not that experience.

two stories where every thing is vibrating by the force of the wind might be, unless the shocks were very strong and sudden. Some reports also reached me that some of the pensioners and Commissariat Officers who reside at Cooly Bazar,* where the houses are all lower-roomed ones only, had also experienced shocks of earthquakes, and I sent a paper of queries for circulation amongst the occupiers of these houses, but only one person clearly and distinctly stated that he had experienced a shock of an earthquake between 12 and 1 A. M. of the 15th, in that locality.

BANKS OF CLOUDS.

It will be noticed that in the Balasore, Pooree (Cuttack), Dinajpore, and other reports the Banks of Clouds indicating the position of the passing or approaching Cyclone, were very distinctly seen, so that had these been ships at sea they would from this sign alone, have had ample and timely warning to take all necessary precautions.

ELECTRIC NOISES.

Mr. Crank's report of these singular and appalling sounds is, I think, conclusive when taken with what I have brought together in the Horn Book, p. 179, regarding the noises heard on the approach and at the passage of the centre of Cyclones,) as to their being electric phenomenæ? but the peculiar interest of Mr. Crank's report is that it corroborates on shore what we have such ample evidence of at sea. That my readers may not suppose there is any exaggeration in this gentleman's account I copy here from Luke Howard's Climate of London, Vol II. p. 151, in a description of the October Cyclone of 1811, as experienced off Halifax by H. M. S. Tartarus and three other men-of-war, the following passage, "I would if possible give you a description of the noise occasioned by the hurricane but I am unequal to the task: if you can conceive however all the savage animals of the brute creation assembled to affright mankind by their roaring you will have some faint idea of the deafening variety of sounds in the tempest we have experienced!"

The report from Cuttack will also be found to afford some remarkable electric evidences.

* A suburb of Calcutta about one mile to the south of the forts on the banks of the river.

Literary Intelligence.

The Rev. Mr. Long's Catalogue of Bengali Books furnishes much useful information which has not hitherto been accessible. It is but an abstract, however, of a larger one now in the press, and which will be of greater interest. The Catalogue confines itself to printed books, which however may be supposed to comprehend all Bengali compositions of any interest. Apparently the oldest work in MS. yet discovered is the Tippera Raj Mala, an analysis of which was given by the industrious author of this Catalogue in vol. 19 of our Journal, but the authenticity of this work was not beyond doubt, and unfortunately the Rajah, notwithstanding the kind exertions of Mr. Metcalfe on our behalf, would not allow us the satisfaction of examining the original MS.

Dr. Sprenger has, on the recommendation of the Supreme Government, obtained the permission of the Hon'ble Court of Directors to complete his Catalogue on the extended plan adopted in his 1st vol. It is stipulated, however, that the work is not to exceed 5 vols.

Dr. R  er has kindly placed at our disposal some letters from Berlin, from which the following translations are extracts.

"Dr. Steinthal has published an excellent work "*Grammatik, Logik und Psychologie, ihre Principien und ihr Verhaltniss einander.*" It is said, that he is to go as French consul or interpreter of the consul to China; for the last two or three years he has studied Chinese in Paris. A. Regnier, a disciple of Burnouf, has published a very able and exhaustive paper on the Vedaic language, in connexion with another "on the formation of Greek nouns." We may expect a new edition of Bopp's "*Vergleichende Grammatik*" and an English translation of it by Austin (?) (Hertford), which is to appear at the same time. The third volume of Lassen's "*Indische Alterthums Kunde*" is about to be printed at Elberfeld. Dr. Pertsch is preparing an edition of the *Taittir  ya Aranyaka* for which he has collected materials in England. I suppose, Baboo Rajendra does not intend to include this in his edition of the *Taittir  ya Br  hmana*. It would be a great pity, if two editions of the same work should be published."

Baboo Rajendra always intended to include the *Aranyaka* in his edition of the *Bráhmaṇa*, which would indeed be incomplete without it. Our Society's project for publishing the Black Yajur has been no secret for the last three years, and this announcement cannot require from us any modification of it. The translation of Bopp referred to in the letter must be Eastwick's, part of which has already appeared.

From a letter from Dr. Weber, dated 11th May.

"Roth's and Whitney's edition of the *Atharva Veda* has appeared. It is very elegantly printed. Benfey has published a new Sanskrit grammar, more compendious than his former one. Four numbers of the 4th volume of Vrahm's *Journal "Für vergleichende Sprachforschung,"* are out; Stenzler prepares an edition of *Párasukas Grihyasútras*. The edition of the *Zendavesta* by Westergaard embraces all the texts. Spiegel is printing a *Huzváresh (Pehlvi)* grammar (in Vienna). He has finished his translation of the *Zend* texts in MS. but not in print; the same is the case with his edition of the text. A Demotic grammar by Dr. Brugsch has been published by Messrs. Dümmler; the types are all new, and it is a master-piece of typography."

We extract the following from a letter from Professor Wright of Oxford to Lieut. Lees.

"I presume you are acquainted with all the recent publications in our particular department. In case however it should be otherwise, I will call your attention to Kosegarten's edition of the *Dewan* of the Hudhailite Arabs *ديوان الهذليين*, to N. v. Tornamo's "*Moslemische Recht*," and to Amari's "*Storia dei Musulmani di Sicilia*." This last promises to be a very valuable work, a side piece to Dozy's *Recherches sur l'histoire de l'Espagne*. The publications of the Parisian Asiatic Society are progressing well; the 3rd vol. of *Ibn Baṭṭah* is in the press, and I believe the first of *Al-Mas'ûdî*.* The 2nd vol. of Juynboll's *Abú 'l-Mahásin* is likewise out. It may ia-

* Lieut. Lees informs us on the strength of late advices from Paris (M. Mohl, dated 16th August) that the printing of the "*Meadows of Gold*"—which had been interrupted by the temporary employment in the Imperial Library of the Editor was rapidly progressing, one-half of the 1st Vol. had been printed.

terest Sprenger to know that a pupil of Fleischer's, by name Ralfs, is preparing an edition of the Burdah قصيدة البردة

"If you are acquainted with any MS. of the *Kāmil* of *al-Mubarrad* الكامل للمبرّد in India, will you kindly inform me of it. I am preparing an edition of this large grammatical work, which contains also much old poetry and many valuable historical data. At Leyden I copied one fine MS.; this I have collated with one lent me by Dr. Sprenger (very bad), and one at Cambridge (tolerable). There is still a 2nd at Cambridge for me to go through.

"I may mention finally that there is a chance of an edition of the well known poems المفضليات. In the last collection purchased by the Berlin Library there is a fine MS. of these poems, and Dr. Josche, one of the Curators has obtained from me the loan of my copy of the MS. in the British Museum for the purpose of collating it."

From Mooltan a letter from Lieut. Raverty contains the following announcement.

"There is a celebrated shrine here of Bhanal Hak whom Shaik Sadi visited at Mooltan. I am getting all the accounts I can concerning it. They say here that the original copy of the *Gulistán* written in Kufic and in red ink was given to Bhanal Hak by the author, and that it is still in the possession of some parties in the Mooltan District!! I am trying to find out."

The writer is just bringing through the Press the last sheets of an excellent Pushto Grammar after publishing which he will give his attention to the Brahooi language.

The N. W. Series to which we alluded in a former number is to consist of selected Mohammedan histories. From a lithographed invitation circulated with a view to purchasing or borrowing MSS., we find that the selection is as follows :

Ferishtah.

Kholasut ool Towarikh.

Chuch Nameh.

Tarikhi Sind.

Turjumah tarikhi Yemíní.

Tabkati Nasiree.

Ferozshahee—Zeea Burnee.
Ditto—Shums Sooraj.
Intikhab Zufur Nameh.
Mukhzun i Afghanee.
Muntukhub ool Lubab.
Tarikhi Chagatai.
Wakiyat i Baberi.
Ditto Humayoon.
Akbur Nameh.
Intikhab i Tarikhi Budaonee.
Zoobdat ool Towarikh.
Masir i Ruheemee.
Masir i Alimgiree.
Jahangeer Nameh.
Badshah Nameh.
Hadikat ool Safa.
Abrut Nameh.
Tarikh i Iradut Khan.
Tarikh i Nadir ool Zamane.
Siyar ool Mootakhereen.
Tarikh i Moozufferi.
Muntukhub ool Towarikh.
Hadikat ool Akalim.
Oosaf.
Tozuk i Timoorie.

It is not intended to publish all these works. These are to be collected for deposit in the Government Colleges and the more important of them and selections from some of them, such as the Muntukhub ool Towarikh, Tarikh i Moozufferi and other general Histories will appear in the Series. Parties lending MSS. for collation will be presented with a copy of the work when printed.

It is indeed high time for the credit of British rule in India to collect these historical materials, when we find native gentlemen admitting to Mr. Hammond, who is to superintend the publication of the Series, that "numberless valuable libraries have been sold as waste paper to druggists and makers of fireworks!" This project, which has been already commenced, a copy of Zeea Burnee's Feroz-

shahee having been prepared for press, is a part of the greater one to carry out which poor Elliott overtaxed himself, and which will yet it is to be hoped be matured and completed under competent management at home.

The plan which Lieut. Lees, assisted by the Moulvees of the Madrasah had formed for publishing al-Zamakhshari's commentary on the Qoran has been so far modified as to include the publication of the text of the latter, which will be given with the *ramooz awqaf* or stops between the verses. Underneath this will be printed the above commentary entitled the *Kashshaf*, to furnish which six or seven copies of the work, some of them of very old date, have been collected from various parts of India. The 1st vol. will, it is hoped, appear in a few months.

Lieut. Lees is also engaged on an edition in 2 vols. 8vo. of the *Tarikh-al-Khalfa* by the celebrated Soyoottee, being the history of the Arabian Khalifs from the commencement of the reign of Aboo Bakr, while he has nearly ready for publication a Persian work, the *Araish i Bozorgan*, which is an obituary with short biographical notices of some 250 Mohammedan saints. This is a compilation from numerous authors whose works are not procurable in India or Europe. Moulvee Kabir oodeen Ahmed has given his assistance in editing this last work and Moulvee Abdool Hak is engaged on the *Tarik-al-Khalfa*.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JULY, 1855.

The usual monthly general meeting of the Society was held on the 4th instant at half-past 8 P. M.

SIR JAMES COLVILE, KT. President in the chair.

The proceedings of the last month were read and confirmed and the accounts and vouchers for the months of February, March, April and May laid on the table.

Presentations were received—

1. From the Private-Secretary to the Hon'ble the Lt. Governor of the North Western Provinces, Meteorological Observations made in November last at Dadoopore, Boolundshahar, Mussooree, Roorkee, Hansi, Allighurh, Meerut and Umballa, in reply to the request made for such information on behalf of M. Leverier of the Paris Observatory.

2. From the Imperial Society of Agriculture, &c. of Lyon, its Annals for the year 1852-53.

3. From the Linnean Society of Lyon, its Annals for the year 1852-53.

4. From the Imperial Academy of Sciences of Lyon, its Memoirs for the year 1852.

Pursuant to notice given at the last meeting, Mr. Houstoun asked whether he might be allowed to see and have access to all papers the property of the Society.

The chairman referred Mr. Houstoun to Bye-law 101, and stated that under that rule the Journal books of the Society and of the Council, were open to the inspection of any ordinary member during office hours. After some discussion, Mr. Houstoun moved that, "he may be allowed to see and have access to all papers the property of the Society." As an amendment to which Dr. Walker moved that the

question, being one of importance, should be referred to the Council for report under Bye-law 45.

The amendment was carried.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members.

W. S. Atkinson, Esq. Principal of La Martiniere.

T. Loch, Esq. C. S.

Lt. R. Stewart, 22nd N. I. Kachar, was named for ballot at the next meeting, proposed by Lt. Bivar and seconded by the Secretary.

A letter from Lt. Bruce, H. M. 29th Regt. communicated his wish to withdraw from the Society.

In accordance with the notice given at the last meeting the President announced that, under the 60th Bye-law, the Council have elected Dr. Spilsbury as a Vice-President, and Capt. James and Mr. Bayley as members of their body, in the room of Col. Baker and Capt. Thuillier resigned.

The President moved that these elections be confirmed.

The question was put and carried.

Communications were received—

1. From Mr. Under-Secretary Morris, announcing that His Honor the Lt. Governor has been pleased to accede to the Society's request for a grant of Rs. 1,200, for paving the basement story of the Museum with Chunar flag-stones.

The President proposed that the best thanks of the Society be conveyed to His Honor the Lt. Governor for this mark of his consideration. The question was put and carried.

2. From Bábu Rádhánáth Shikdar enclosing abstracts of the hourly Meteorological Registers kept at the Surveyor General's Office, Calcutta, for the months of March and April last.

3. From Lt. G. H. Raverty, forwarding an account of a visit to the shrine and town of Sakhi Sarwar in the lower Dirajat, with a notice of the Annual Melá or Fair held there.

4. From Bábu Rájendralál Mitra, submitting a note on two inscriptions from the Island of Putu in the Chusan Archipelago.

5. From Rev. J. Hislop, communicating a paper on the age of the coal strata in Western Bengal and Central India.

The Librarian and the Curator in the Zoological Department having submitted their usual monthly reports, the meeting adjourned.

Report of Curator, Zoological Department, for July, 1855.

1. The first contribution which I have now the pleasure of bringing to notice is that of two fine (and nearly perfect) skeletons of the *Mias Rambi* Orang-utan (*Pithecius Brookei*, nobis, *J. A. S.* XX, 375); presented to the Society by Sir James Brooke, K. C. B., Governor of Sarawak.

The skeletons are those of a fully adult but not aged female, with the epiphyses of the limb-bones well anchylosed, yet with sagittal crest undeveloped,—and of a nearly full-grown male, with incipient sagittal crest, but with the epiphyses of the limb-bones more or less detached and exhibiting other proofs of incomplete growth. In both specimens, the third or last permanent grinders had been brought into wear; the amount of attrition being considerable in the female, and much less so in the male.

As from the structure of the pelvis and certain other characters, no doubt whatever can exist respecting the sexes of these two individuals, we accordingly obtain the requisite data for deciding upon the sex of the skeleton of an adult *Mias Pappan* which was presented on a former occasion to the Society; and can now pronounce, with confidence, that the latter was a male animal, and moreover it appears from accumulating evidence that the *Mias Pappan* is a smaller animal than the *Mias Rambi*, the adult female of the former corresponding in size with the adult male of the latter; the male of the *Rambi* (to judge from its skull) being much larger.

Individuals, however, of each may vary in size; as the skull of the female *Rambi* now sent is considerably larger than that of the much older female *Rambi*, with high sagittal crest, figured in plates 3 and 4 attached to the memoir upon this genus in *J. A. S.* Vol. XXII. A distinguishing sexual feature would appear to exist in the conspicuously greater breadth of the orbital ring exteriorly (especially its malar portion) in the male, and also the greater breadth of muzzle in the adolescent male, and the general appearance of massiveness, indicative of its future growth, as compared with the skull of an adult female. In our huge old Sumatran male, the extent of grinding surface of the series of upper molars (including bicusps) is $2\frac{1}{2}$ in.; in the young Bornean male now sent, $2\frac{1}{4}$ in.: the anterior bicuspid of the latter being somewhat pushed forward outside of the hind margin of the canine, and the interspace between the canine and outer incisor being but half as great as in the fully developed animal. In both females, the same grinding surface is but $2\frac{1}{4}$ in.; and in the adult male *Pappan*, intermediate, or $2\frac{1}{2}$ in. This male *Pappan* (as

now determined), to judge both from the degree of attrition of its molars, and that of *anchylosis*, was a somewhat (but not much) younger animal than the female *Rambi*, and considerably more mature than the adolescent male *Rambi*: both of the former, however, had certainly attained their complete growth, and we observe a marked difference in the proportions of the limbs, which alone would go far to remove any doubt of the distinctness of the two species.

The extreme length of humerus of the adult male *Pappan* is $14\frac{1}{2}$ in., and of ulna $14\frac{1}{2}$ in.; in the adult female *Rambi*, respectively $14\frac{1}{2}$ and 15 in.: femur of male *Pappan* $10\frac{1}{2}$ in.; of female *Rambi* $11\frac{1}{2}$ in.: tibia of former, $9\frac{1}{2}$ in.; of latter, $9\frac{1}{2}$.

The total length of pelvis in the female *Rambi* is 11 in.; extreme breadth apart of the ilia $11\frac{1}{2}$ in.; of pelvic aperture (measured behind) $3\frac{1}{2}$ in.: the corresponding measurements in the male *Pappan* being respectively $9\frac{1}{2}$ in., $10\frac{1}{2}$ in., and $2\frac{1}{2}$ in.

A more detailed comparison must be deferred until we can get the female *Rambi* skeleton mounted. At present, we may remark that our great Sumatran male *Rambi* skull (Vol. XXII, plates 1 and 2,) about corresponds with Prof. Owen's great Bornean *Rambi* skull, figured in *Tr. Zool. Soc.* Vol. 2, pl. 31; only that the supra-orbital ridges are less flattened back, and the profile consequently is more concave: while the Bornean female *Rambi* now received would correspond with Prof. Owen's Sumatran (?) female, figured in *Tr. Zool. Soc.* Vol. 1, pl. 53, were it only much older, and had it its sagittal crest developed; its lambdoidal crests are remarkably developed. In the adolescent male *Rambi* skull, it is remarkable that the nasal bones continue distinct (which is unusual in this genus, even in the half-grown animal); the two being but very imperfectly united, and the same is observable in our adolescent female small Orang skeleton with comparatively short fore-arms. In our adolescent male *Rambi*, the nasal bones do not ascend upon the *glabella* as in our other *Rambi* skulls.

2. T. C. Jerdon, Esq., Ságur. Specimen of a new Indian species of Swallow, belonging to the group of 'Republican Swallows' (*Petrochelidon* of the Prince of Canino), and having similar habits to the well known *Hirundo fulva* of N. America. The specimen is not a good one to describe from, being not fully mature; but its upper-parts should be glossy black, with white lateral edges to the dorsal feathers more or less seen: the rump brownish; and crown dark rufous: lower-parts white, with black mesial streaks to the feathers of the throat and breast; the under surface of wings pale brown: tail slightly furcate, with a slight whitish spot more or

less developed towards the tip of the inner web of most of its feathers: tertiaries also whitish-tipped. Length about $4\frac{1}{2}$ in., of which tail $1\frac{1}{2}$ in.; wing $3\frac{1}{2}$ in.—*HIRUNDO FLUVICOLA*, nobis, *n. s.* "This interesting new retort-nest building Swallow," writes Mr. Jerdon, "I discovered during a late trip, and found it only in two spots, building in company; the nests crowded together on rocks overlying the rivers (Sonar and Kane) in Bundelkund. It was then breeding (April and May), but I could not get at the nests." A rough sketch of the latter is sent, representing "retort-nests" with short necks, and crowded together, similar to those of the American *H. FULVA*, Vieillot (v. *H. brunnifrons*, Say).

3. From Major A. P. Phayre, Commissioner of Pegu. A collection of skins procured in the course of a recent tour through that province.

Of mammalia, are sent the skin of a Jackal, that of a Hare, and those of three species of Squirrel.

The Jackal (*CANIS AUREUS*) was shot at Meaday by Lt. Bosworth of the Bengal Artillery, and (as remarked by Major Phayre)—"has set at rest the question of that animal being found in Burmah or not."

The Hare is not *LEPUS SINENSIS* (as supposed from the much discoloured fragments of a skin, noticed *J. A. S. XXI*, 359); but is of a peculiar and hitherto undescribed race, which may be designated

LEPUS PEGUENSIS, nobis, *n. s.* Very similar to *L. RUFICAUDATUS*, Is. Geoffroy, of Bengal, and all Upper India, Asám, &c.; but at once distinguished by having the tail black above, as in the generality of the genus. The upper-parts are of the same colour as in the Bengal Hare, but contrast directly with the pure white of the belly, instead of passing to it through fulvous as in the other; and the limbs also shew but a slight fulvous tinge, with white hairs intermixed, especially on the hind-limbs where the white predominates: the chin and throat (in fact the fur over the whole lower jaw) are conspicuously white; and the short sparse hairs on the outside of the ears are whitish,—except in front, and also the tip posteriorly, whereon is a large blackish terminal patch. The fur of the upper-parts is pale dusky-grey at base, then black, and finally bright fulvous-brown with black extreme tips: towards the tail above is a strong tinge of ash-colour. Size, proportions, and structure, as in the common Hare of all Upper India.*

* Of the Hare from the vicinity of Dacca referred to by the name *L. TYTLERI* in the *Ann. Mag. N. H.* for September, 1854, p. 176, the Society possesses a specimen presented by Capt. Robt. Tytler, of the 38th N. I. (*J. A. S. XXII*, 415); but we can perceive in it no distinction from the common *L. RUFICAUDATUS*, stated also by Capt. Tytler to inhabit the same district.

The three species of Squirrel sent are the large *SCIURUS BICOLOR*,—*SC. KERAUDRENI*,—and *SC. PYGÆRYTHRUS*. The first abounds throughout the Burmese countries and the Malayan peninsula, and northward to the Asam hills and those of Sikim and Nepal: but its pale variety we have only seen from the Malayan peninsula. Himalayan specimens (*Sc. macrouroides*, Hodgson,) have longer fur on the ears, but present no further difference that we can perceive; and even this may be merely seasonal. *SC. KERAUDRENI* is common in Arakan: and we recognise in *SC. PYGÆRYTHRUS* a species formerly sent from Rangoon by Dr. Fayrer, being the supposed variety of *SC. LOKEOIDES* noticed in *J. A. S. XXII*, 414, and distinct from the presumed variety of *SC. PYGÆRYTHRUS* formerly sent by Major Phayre from Moulmein, which is described *J. A. S. XVII*, 345, and may now stand as *SC. PHAYREI*, nobis, *n. s.**

* The multiplicity of small Squirrels with mostly annulated or grizzled fur, inhabiting the Burmese and neighbouring countries, are most difficult to discriminate. Of the group of gigantic Squirrels, there is only *SC. BICOLOR* (and its pale variety in the Malayan peninsula); and of that of small striped Squirrels, only *SC. BERMOREI*, nobis (*J. A. S. XVIII*, 603), and *SC. BARBEI*, nobis (*J. A. S. XVI*, 875), that we know of as yet,—though *SC. INSIGNIS*, Horsfield, is likely to inhabit the more elevated interior of the Malayan peninsula: but the other small and medium-sized Squirrels seem almost interminable; and we have the following series in our museum, which may be briefly indicated with advantage, for the benefit of students.

1. *SC. RAFFLESII*, Vigors and Horsfield: *Sc. Prevostii*, Desmarest. Larger than *Sc. hippurus*. Black above, deep rufo-ferruginous below and on the feet; a very broad white lateral band from mouth to haunch, extending over the outside of the thigh, and more or less greyish from cheek to shoulder (inclusive): tail of a somewhat duller black than the back, and a little rufescent at tip. Inhabits the Malayan peninsula.

Remark. A nearly affined race inhabits Borneo, which is the *SC. REDIMITUS*, Van der Boon, and when half-grown—*Sc. rufogularis*, Gray, erroneously (in all probability) supposed from China. This race has blackish cheeks and rufous shoulders; a grizzled band, formed of whitish-tipped hairs, above the white lateral band, and this grizzling is continued over the haunch and hind-limb: the tail also is much grizzled with white, in a specimen presented by the Batavian Society to our museum. Of very numerous examples of *SC. RAFFLESII* (from the Malayan peninsula) examined, we have observed no remarkable variation, nor tendency to assume the distinctive colouring of *SC. REDIMITUS*: but *SC. RUFONIGER*, Gray, is probably a more individual variety of the former, especially as Malacca is given as its habitat. It is thus briefly described:—"Black; throat, inner side of legs, and beneath, bright red; an indistinct streak along each side, and the outer side of the thigh, white, grizzled." *Ann. Mag. N. H. X*, 263 (1842).

Among the birds, we observe, with surprise, an unmistakable specimen of the common British Meadow Pipit (*ANTHUS PRATENSIS*) in its summer plumage. We have never seen this bird from any part of India, though Mr. Gould states it to occur in the west (*P. Z. S.* 1835, p. 90).

By Dr S. Müller and also by Dr. Cantor, the Malacca and Bornean races are considered as mere local varieties of one species: but the application of this principle of classification to many of the following races could only be most arbitrary).

2. *SC. HIPPIURUS*, Is. Geoffroy: *Sc. rufogaster*, Gray; *Sc. castaneiventris* (?), Gray, the young? Much larger than the common British Squirrel. Lower-parts and inside of limbs deep rufo-ferruginous; head, shoulders, and sides of limbs, dark grizzled ashy; rest of upper-parts, with base of tail, deeply tinged with rufous, and also grizzled,—contrasting much with the dark leaden-grey of the cheeks and limbs externally: rest of tail dullish black; and feet nigrescent. Common in the Malayan peninsula, Sumatra and Java. We have seen very numerous specimens from the first named region, but no variation whatsoever.

3. *SC. ERYTHROGASTER*, nobis, *J. A. S.* XII, 972: *Sc. hippurus* of Asám, auctorum. Upper-parts uniformly of nearly the same dark grizzled ashy as the head and outside of limbs of the preceding race; this grizzling extending about half way along the tail, the remainder of which is dull black: feet nigrescent; and lower-parts deep rufo-ferruginous. Inhabits the Munnipur hills, and those E. and S. of Upper Asám.

4. *SC. ERYTHRÆUS*, Pall.: *Sc. hippurus*, var., McClelland and Horsfield. Colours nearly as in *SC. HIPPIURUS*, but duller and more blended; the rufo-ferruginous hue of the belly contrasting abruptly at the sides of the body (whereas in *SC. HIPPIURUS* the sides are so rufous that the contrast is much less decided): ears bright rufous; and the terminal two-thirds or more of the tail are nearly of the same colour as the belly, the tip generally being paler. There is also more or less rufous about the muzzle. Inhabits the Khásya hills, and neighbouring mountains of Lower Asám.

(N. B. *SC. ERYTHRÆUS* is described to have slightly ciliated ears (*auricula sub-barbata*), and a blackish stripe running down the tail. The ears of our animal can scarcely be termed ciliated; but two very young specimens from Asám have the basal third of the tail black posteriorly (except at the extreme base), passing more or less upward as a medial line; and it is probable that some adults exhibit the line as described.

It would seem further that the rufous of the muzzle extends sometimes more or less over the crown; and that the tail-end is occasionally blackish, though we have never seen it so (*var. b.* from Butan, of Gray's British Museum Catalogue).

If Nos. 2, 3; and 4, are to be regarded as merely local varieties of the same species, No. 5 should also be so classed: but the difficulty begins with No. 6; and if that be admitted, why not also Nos. 7, 8, and even 9? Wherever drawn, the

OBIOLUS TENUIROSTRIS, nobis, *J. A. S.* XV, 48. A fine adult specimen. We formerly described this species from the skin of a young bird, not in good plumage, which we found among a lot of skins put away as duplicates; and there can be little doubt now that the specimen referred to

line will be quite arbitrary; and, by the same rule, *Sc. PALMARUM* and *Sc. TRI-STRIATUS* of India should be placed as varieties of one species, although their voice is singularly different, and the latter race keeps everywhere to the jungle, instead of coming much into gardens and about houses like the other).

5. *Sc. KERAUDRENI*, Is. Geoffroy. Entirely of a deep rufo-ferruginous colour, with blackish paws, and whitish tail-tip: the tail, indeed, only differing from that of No. 4 is not being grizzled at base. Common in the hilly parts of Arakan and Pegu.

6. *Sc. HYPERYTHRUS*, nobis, *n. s.*: *Sc. erythræus*, var. A (?), Gray's *Br. Mus. Catal.* A little smaller than the four preceding races: the upper-parts uniformly grizzled throughout, black and golden-fulvous, but a strong ferruginous tinge on the head, and the ears bright rufous: lower-parts deep rufo-ferruginous, fading on the throat: tail coloured like the back, but its terminal half more brightly tinged with ferruginous and distinctly annulated: paws nigrescent. Length 8 or 9 in.; of tail with hair somewhat less; and foot $1\frac{1}{2}$ in. From Tenasserim (Moulmein?). Presented by Capt. Berdmore.

7. *Sc. GRISZOPECTUS*, nobis, *J. A. S.* XVI, 873. Size of last. The general colour paler, uniformly grizzled throughout on the upper-parts and tail, which has a slight black tip: throat and breast also grizzled, and faintly washed with ferruginous; the belly and inside of limbs much deeper ferruginous: paws not darker than the rest, and no rufous about the face; but a pale ferruginous tinge on the tail. Habitat unknown. Described from a caged animal, in fine condition, which was transferred to the museum at its death.

8. *Sc. CONCOLOR*, nobis, *n. s.* (referred doubtfully to *Sc. MODESTUS*, S. Müller, in *J. A. S.* XX, 166). Size of the two preceding, and much like the non-rufous specimens of *Sc. CHRYSONOTUS*; or like *Sc. NIGROVITTATUS*, but larger and without the lateral stripes and rufous tinge about the head. Lower-parts dull ash-colour: the rest grizzled throughout with black and dull ruddy-ferruginous; the latter somewhat brighter on the middle of the back, croup, and upon the tail, which last is conspicuously ringed with black and dull ferruginous, and has a black tip mingled with hoary-white. From the vicinity of Malacca.

9. *Sc. CHRYSONOTUS*, nobis, *J. A. S.* XVI, 873. Size of the three preceding; and colour variable, but with always a conspicuous black tail-tip. Fur grizzled ash-gray on the limbs and under-parts, and more or less tinged with bright ferruginous on the upper-parts, especially on the nape and fore-part of the back; but in some specimens there is scarcely an obscure wash of this ferruginous, while in others the whole nape, shoulders, and anterior two-thirds of back, are intense

was from Arakan. Its distinctness as a species was obvious; and we now describe a fine adult from Pegu. From the other black-naped Orioles, it is at once distinguished by its much more slender and more distinctly curved bill, of a reddish colour; and by its narrower black eye-band,

bright ferruginous, shading off more or less to grey on the back and branches: tail grizzled, sometimes a little tinged with ferruginous, and more distinctly annulated towards its black tip. Common in the Tenasserim valley.

(Qu. Does this animal vary in colour according to season, or become more deeply tinged with ferruginous as it advances in age? Our specimen least so tinged is from Mergui; and exhibits merely a faint wash of ferruginous, and this chiefly on the sides of the neck and body.)

The next three species are very closely affined, and not always easy to describe. They are much smaller than the preceding.

10. *Sc. PYGMYTHRUS*, Is. Geoff. Grizzled above as in non-rufous specimens of *Sc. CHRYSOTRUS*; below weak ferruginous, more or less deep, in some tolerably bright, in others faint and passing to whitish on the throat and sides of face: tail coloured like the back, and more or less distinctly annulated above, with a black extreme tip; below, the rufous of the lower-parts extends more or less up its base, but seldom conspicuously. Length about 7 in.; and tail with hair somewhat more: hind-foot $1\frac{1}{4}$ in.; fringed internally and all the toes tufted with rufous hairs. From the valley of the Irawadi (Rangoon, Pegu, &c.)

11. *Sc. ASSAMENSIS*, McClelland, Gray: *Sc. Blythii*, Tytler (*Ann. Mag. N. H.*, Sept. 1854, p. 72). Differs from the last in being more fulvescent above, and much less so underneath: tail-tip generally blackish; and commonly a greater development of pale ferruginous underneath the tail than in *Sc. PYGMYTHRUS*: above, the tail is very indistinctly annulated, if at all so: hue of the upper-parts more or less fulvescent; of the lower dingy whitish, with commonly a slight fulvescent tinge. A very abundant species, inhabiting the valley of Assam, and found about Dacca; also in Tippera, Chittagong, and Arakan.

12. *Sc. LOKNAIDES*, Hodgson: *Sc. lokriak* apud Gray, *Brit. Mus. Catal.* Upper-parts darker than in the preceding, with never a black tail-tip; and the thighs externally often deeply tinged with rufo-ferruginous, though not a trace of this exists in many specimens. From Nepal and Sikim (*larai*!).

13. *Sc. LOKNAH*, Hodgson (nec apud Gray, *Brit. Mus. Catal.*): *Sc. subflaviventris*, McClelland. Size about that of the three preceding races, or a trifle larger; and the general hue darker and more ruddy above than in *Sc. LOKNAIDES*, grizzled as usual, and with the under-parts moderately deep ferruginous, sometimes rather weak: tail coloured nearly as the back, but with whitish tips above, more or less developed; beneath, tinged with ferruginous, and exhibiting distinctly a double border on each side, from every hair having a white tip and black subterminal portion. A mountain species, inhabiting Nepal, Sikim, &c.

and consequent greater extent of yellow upon the crown: upper-parts bright yellowish-green (rather than greenish-yellow), becoming more yellowish on the rump and upper tail-coverts: crown, neck (below the black occipital band), and entire under-parts, intense pure yellow: inner webs

with the Khásya hills, and those of Arakan: but the few specimens we have seen from the Arakan mountains seem to be smaller, and of a weaker ferruginous on the under-parts; perhaps a distinct race, but we have not the requisite data to form an opinion on the subject.

14. *Sc. tenuis*, Horsfield. A Malayan species affined to the last, but considerably smaller, with the under-parts having but a very faint wash of ferruginous, while a stronger tinge of this hue appears on the shoulders and outside of the limbs; tail coloured as in *Sc. LUKIAH*, but the black and white margins (as seen from behind) are hardly so conspicuous. We suspect that it is confined to a certain elevation in the Malayan peninsula and neighbouring great islands.

15. *Sc. modestus*, S. Müller: *Sc. affinis*, Raffles, apud Horsfield, *Zool. Res. in Java*; nec *Sc. affinis* (verus), as described by Sir Stamford Raffles, *Lin. Tr.* XIII, 259, which description refers distinctly to the pale variety of *Sc. bicolor*: assigned dubiously by Dr. Cantor as a synonyme of *Sc. tenuis*. Apparently very like the last, but larger, with the rufous more developed on the outside of the limbs and along the flanks. "Length 9 in., and tail 7 in." (Horsfield). Inhabits the Malayan peninsula, and has been met with on the island of Pulo Penang. We have seen no specimen.

16. *Sc. Phayrei*, nobis, n. s.; *Sc. pygerythrus*, var., apud nos, *J. A. S.* XVII, 345. A beautiful species, of the size of *Sc. vittatus*, and nearly of the same colouring above, but the fur longer, and the tail much more bushy, with a well-defined black tip. Lower-parts bright ferruginous, inclining to maroon on the belly, and continued broadly along the under or hind surface of the tail to its black tip: inside of limbs ferruginous, continued nearly round the hind-limbs, and upon all the feet; the fore-limbs tinged with dusky externally, above the pale rufous foot; and a broad imperfectly defined blackish band upon the flanks, separating the colours of the back and belly. Length 9 or 10 in.; and tail with hair about the same: hind-foot $1\frac{1}{2}$ in. From some part of the Tenasserim provinces. Presented by Major Phayre.

17. *Sc. vittatus*, Raffles: *Sc. bivittatus*, Desmarest. This very common Malayan species does not appear to extend northward into the Tenasserim provinces. It is readily distinguished by its two lateral bands, the upper white and lower black, with deep rufous under-parts and tail-tip.

18. *S. nigrovittatus*, Horsfield: *Sc. griseoventer*, Is. Geoffroy. Differs from the last by having the belly ash-grey, no rufous at tip of tail, but a ferruginous tinge on the sides of the head and neck: its upper lateral band is also fulvous, rather than white. Inhabits the Malayan peninsula, where much less common than *Sc. vittatus*.

of the tertiaries dusky-black: the outer coloured like the back, with a slight yellowish spot at tip, and the secondaries narrowly bordered with yellowish: terminal half or more of the greater coverts of the primaries bright yellow; and a few of the outermost coverts of the secondaries tipped with the same: middle tail-feathers black, the rest successively more broadly tipped with yellow; and the tail conspicuously more even or squared than in the commoner *O. INDICUS* of the same countries.*

19. *SC. ATRODORSALIS*, Gray. Size of the preceding, with generally a much more bushy tail: upper-parts grizzled black and fulvous, with a great black patch upon the back; head rufescent, with white whiskers: lower-parts varying in hue from weak ferruginous to deep maronne-red: a tinge of the same upon the haunches; and hairs of the tail black with broad fulvous tips. In one specimen before us, with deep rufous ears and dark maronne-red under-parts, the tail is throughout grizzled like the back, and much less bushy than usual: perhaps a distinct race from those with ferruginous under-parts more or less deep, and an extremely bushy tail. Inhabits the Tenasserim provinces.

20. *SC. CANICEPS*, Gray, is thus described. "Pale grey, grizzled: back yellowish: beneath, paler grey: tail long, grey, black-varied, ringed, the hair with three broad black bands." Size—? Inhabits Butan (*Ann. Mag. N. H.* X, 1842, p. 263).

21. *SC. TUPAIODES*? A very curious species inhabiting the Malayan peninsula, which, by its lengthened snout and aspect generally, quite simulates the genus *TUPAIA*, Raffles, of the order *Insectivora*. It is doubtless the *RHINOSCIURUS TUPAIODES*, Gray (Appendix to *Brit. Mus. Catal.*, p. 195), from Singapore; but we doubt its being correctly referred to *SC. LATICAUDATUS*, Diard (*S. Müller, tab. XV, f. 1, 2, and 3*), by Dr. Cantor (in *J. A. S.* XV, 251). The latter would rather appear to be a second species of the same peculiar type, of much paler and more rufous hue than the Malacca animal, and differing remarkably in the relative proportion of its molars, as noticed by Dr. Cantor (*loc. cit.*), and which inhabits the western coast of Borneo. In a Malacca specimen in our museum, there is even an indication of the pale shoulder-stripe of the *TUPALÆ*!

* We are acquainted now with five species of black-naped Orioles; viz.

1. *O. CHINENSIS*, L. (*vide J. A. S.* XV, 46). China (and the Philippines?)
 2. *O. MACROURUS*, nobis (*vide loc. cit.*) Nicobar islands only, so far as known at present.

3. *O. INDICUS*, Brisson, Jerdon (*vide loc. cit.*) Common in the Burmese countries; rare in Lower Bengal: found also in S. India and in China.

4. *O. CORONATUS*, Swainson: *O. hippocrepis*, Wagler. Differs from *O. INDICUS* in having a narrower nape-mark, a shorter wing, and by the considerably reduced development of the yellow on the secondaries and tertiaries. Hab. Java, and probably other islands of the great archipelago.

5. *O. TENUIROSTRIS*, nobis, *ut supra*. Burmese countries.

CHATARRHÆA GULARIS, nobis, *n. s.* A handsome species of this group, and the first which we have seen from the eastern side of the Bay of Bengal: though *CH. EARLEI*, nobis, extends into Tippera. It is affined to *CH. EARLEI*, but with a still longer tail, which is more distinctly rayed across. Colour ruddy-brown, passing to olivaceous on the hind-part of the back, each feather having a narrow black mesial streak: frontal feathers narrow, stiffish, pointed, and white with black mesial line; these peculiar feathers continued over but not beyond the eye: lores blackish: chin and throat pure white, extending down the front of the neck: ear-coverts and sides of neck unstreaked ruddy: breast and flanks ruddy-brown, paler on belly, and the lower tail-coverts duller brown: tail dull olive-brown, and conspicuously rayed across. Bill dull plumbeous, yellowish towards gape; and legs pale brown, darker on joints. Length about 11 in.; of tail 6 in.: closed wing $3\frac{3}{8}$ in.; bill to gape 1 in.; and tarse $1\frac{1}{8}$ in. Pegu.*

ARACHNOTHERA AURATA, nobis, *n. s.* Like *A. MAGNA*, (Hodgson), but considerably smaller, with the mesial dark streaks to the feathers much less developed, excepting on the crown, and becoming almost obsolete on the rump: on the lower-parts, they are scarcely broader than the shafts of the feathers, whereas in *A. MAGNA* they are much broader: the edge of the wing is also of a much brighter yellow than in *A. MAGNA*. Length

* Having had occasion to re-examine the series of Indian CRATEROPODINÆ, it was found expedient to subdivide the genus *MALACOCERCUS*, Swainson, as follows:

1. *ACANTHOPTILA*, nobis. Type, *Timalia nipalensis*, Hodgson.
2. *CHATARRHÆA*, nobis. *CH. GULARIS*, *ut supra*, is about the most typical species. Others exist in *CH. CAUDATA* (*Timalia chatarrhæa*, Franklin),—*Ch. Huttoni*, nobis, *J. A. S. XVI*, 476, from Kandahar,—and *CH. EARLEI*, nobis.
3. *MALCOLMIA*, nobis. Type, *M. ALBIFRONS* (v. *Garrulus albifrons*, Gray, *Hardw. Ill. Ind. Zool.*, v. *Timalia Malcolmii*, Sykes). A second species would seem to exist in the *Malurus squamiceps*, Rüppell, of Egypt and Nubia; and a third probably in the *M. acaciæ*, Rüppell, of Arabia Petræa.
4. *LAYARDIA*, nobis. Type, *L. SUBRUFÆ* (v. *Timalia subrufa*, Jerdon, v. *T. pæcilorhyncha*, Lafresnaye). A second species would seem to exist in the *Crateropus rubiginosus*, Rüppell, of Schoa.

5. *MALACOCERCUS*, Swainson; as confined to the species with rounded frontal plumes and less elongated and graduated tail, which are affined to the true CRATEROPODES of Africa (as exemplified by the *Ixos plebeius*, *leucocephalus*, and *leucopygius* of Rüppell; the *Crateropus Jardini*, A. Smith, of S. Africa, illustrating another division of the same group). Of restricted *MALACOCERCUS*, about ten species (or distinguishable races) exist in all India and Ceylon, of which range of country they appear to be confined exclusively.

of wing 3 in. (instead of $3\frac{1}{2}$ in. or more), and the rest in proportion. From Pegu.

PYCNONOTUS HÆMORRHOUS, (Gm.) Specimen rather large, with closed wing $3\frac{3}{4}$ in.; but otherwise resembling examples from Arakan, S. India and Ceylon, Orissa, Agra, &c.; one from Wuzirabád being even larger, with wing $3\frac{1}{2}$ in.; the ordinary length being from $3\frac{1}{2}$ to $3\frac{3}{4}$ in. In *P. CAFER*, (L.), of Bengal, Nepal, Asám, Tippera, Deyra Doon, &c., the length of closed wing of the male is generally 4 in. The latter species has always a black nape; whereas the other has merely a black cap, the nape being coloured like the back, though generally with whiter margins to the feathers. In *P. CAFER*, also, the black of the lower-parts descends much further over the breast than in *P. HÆMORRHOUS*. *P. NIGROPILEUS*, nobis, of the Tenasserim provinces is a third nearly affined race, which differs from *P. HÆMORRHOUS* in having the black of the lower-parts confined to the chin, or even wanting altogether; and that of the cap well defined and contrasting sharply with the more or less whitish-edged feathers of the nape.

Genus *CORVUS*, L. Two species of Crow are sent, one being the common black Crow (*C. GULMINATUS*, Sykes,) of all India, and which we have received from Pinang and Malacca, where it occurs together with another black species, the *C. ENCA* (?), Horsfield (v. *macrorhynchus*, Wagler); and the other being the *melanoid* variety of our ordinary Indian Crow (*C. SPLENDENS*, Vieillot), which appears to be the common Crow of the Tenasserim provinces. In the Pegu specimen now received, and another from Mergui (all that we have seen as yet from that range of country), the *melanism* is more pronounced than in Cinghalese specimens, which exhibit a more decidedly ashy tinge on the nape and breast. In the Pegu specimen this is by no means conspicuously observable: yet Major Phayre remarks of it, that—"this is the common Crow of the branches of the Irawádi; but away from the river in the hills there is a Crow of the same size, but not with the same tinge on the neck, being of an uniform black throughout."

A fine specimen of our Indian *MACROPTERYX CORONATUS*, (Tickell), is the first example of this species which we have seen from the eastern side of the Bay of Bengal. In the Malayan peninsula, it is replaced by *M. KIECHO*, (Horsfield), and also (it would appear) by the very beautiful *M. CORONATUS*, (Tem.)

Of Pigeons, are sent *TEERON VIEIDIFRONS*, nobis: *TE. MALABARICA*, Jerdon; * *CARPOPHAGA CENEA*; and a pair of Turtle-doves, which are just

* A Ceylon species which we consider to be *TE. ROMPADORA*, auct., differs from *TE. MALABARICA* in being rather smaller, with bright yellowish-green forehead,

intermediate to *T. SURATENSIS* of India and *T. TIGRINUS* of the Malay countries, or which at least is the race inhabiting the Malayan peninsula. In the *Comptes Rendus*, tom. XI, 17 (January, 1855, No. 2), the Prince of Canino states that the Chinese *T. SINENSIS* extends its range to the Philippines and all Malasia; but we have never seen it from the Malayan peninsula, where a distinct race abounds, resembling *T. SURATENSIS* except in wanting the pale vinaceous spots on the scapularies and wings, while retaining the black mesial streaks which are wanting in *T. CHINENSIS*: there is also much less ash-colour on the wings than in *T. SURATENSIS*: but it is of the same size as the latter, or much smaller than *T. CHINENSIS* (which last has also deep ash-coloured lower tail-coverts). Of the two Peguan specimens now sent by Major Phayre, one differs little from the Malayan peninsula Dove, except that the spotting begins to appear upon the wings; while in the other the spots spread over the back, but are of a dull rusty colour and less defined than in the common Indian race. The Prince of Canino remarks, that *T. SURATENSIS* is particularly abundant in Ceylon: but it can scarcely be anywhere more so than in Lower Bengal.

FRANCOLINUS PHAYREI, nobis (*J. A. S. XII*, 1011), et *FR. SINENSIS*, (*Tetrao sinensis*, Osbeck; *T. pintadeus*, Scopoli: *T. perlatus* et *T. mada-gascariensis*, Gmelin, nec Scopoli). We have compared the 'Pintado Partridge' of the Mauritius with a Chinese specimen, and can detect not the slightest difference; wherefore it may be inferred that the species was probably introduced into the Mauritius direct from China.* We now hesitate to consider *FR. PHAYREI* as distinct from *FR. SINENSIS*: the difference between them being even less than between *CACCABIS GRÆCA* (v. *saxatilis*) and *C. CHUKAE*! As compared with *FR. SINENSIS*, the Peguan bird would seem to have the long black supercilium broader, and extending more across the forehead, and the rufous supercilium above it narrower, and paler; also to have more developed spurs, and a somewhat

the throat yellower, and breast unsullied green (or having no ruddy patch): lower tail-coverts also white mixed with green, in both sexes; as in the female (not the male) of *TR. MALABARICA*. Closed wing of male $5\frac{1}{2}$ in.; in the other $5\frac{1}{2}$ to 6 in.

* The Stag of the Mauritius seems, in like manner, to be the *C. RUSA* apud S. Müller, of Java, but with antlers certainly more flexuous in the beam. The Mauritian Hare is *LEPUS NIGRICOLLIS* of S. India and Ceylon, v. *L. melanauchen*, Tem., of Java, where also it has probably been introduced. The *GALLOPERDIX SPADICEUS* of S. India (a thorough Indian type) is common in the Mauritius, and (it is said) also in Madagascar, which latter surely requires confirmation! A common Malayan Monkey (*MACACUS CYNOMOLGOS*) is said to have gone wild on the island; and perhaps one or two of the small Passerine birds may have been introduced, as *ESTREDA ASTRILD* from S. Africa, and certainly *ACRIDOTHERES TRISTIS* from India (the latter for the purpose of keeping down the locusts).

smaller bill. In *FR. PHAYREI* the spurs seem generally to be $\frac{3}{4}$ in. length : and it remains to ascertain if they ever exceed $\frac{1}{2}$ in. in the species inhabiting China and the Mauritius. In plumage we can detect no further difference than has been mentioned ; and have never seen females of either.

The rest of Major Phayre's Peguan birds are as follow :—*PALEORNIS TORQUATUS*, *P. SCHISTICEPS* (!), *P. CYANOCEPHALUS*, *BUCEOS ALBIROSTRIS*, *HALCYON GURIAL*, *ALCEDO BENGALENSIS*, *CORACIAS AFFINIS*, *EURYSTOMUS ORIENTALIS*, *MEGALAIMA LINEATA*, *CHREYSOCOLAPTES SULTANEUS*, *TIGA INTERMEDIA*, *PHENICOPHAUS TRISTIS*, *HARPACTES ERYTHROCEPHALUS*, *DENDROCITTA RUFA*, *GRACULA INTERMEDIA*, *GARRULAX BELANGERI*, *PABUS FLAVOCRISTATUS*, *PASSER FLAVEOLUS*, *EMBERIZA AUREOLA*, *PIPASTES AGILIS*, *PRINIA RUFESCENS*, *POMATORHINUS LEUCOGASTER*, *TEPHRODOERNIS PONTICERIANA*, *PETROCOSSYPHUS PANDOO*, *COPSYCHUS SAULARIS* (*nec MIN-DANENSIS*), *CERCOTRICHAS MACROURUS*, *CYORNIS RUBEOLOIDES*, *ERYTHROSTERNA LEUCURA*, *PRATINCOLA CAPRATA*, *PERICROCOTUS SPECIOSUS*, *CHAPTIA GENE*, *EDOLIUS PARADISEUS* (*var. GRANDIS*, Gould), *DICREURUS LONGICAUDATUS*, *MYIAGRA AZUREA*, *PYCNONOTUS MELANOCEPHALUS*, *IOLE VIRESCENS*, *PHYLLOERNIS COCHINCHINENSIS*, *IRENA PUELLA*, *ORIOLOUS MELANOCEPHALUS*, *TURNIX OCELLATUS*, *HOPLOPTERUS VENTRALIS*, and *BUTORIDES JAVANICUS*.

Also, of *REPTILIA*, a small Box terrapin, which heretofore has only been satisfactorily known to inhabit Java. It is the *CISTUDO DENTATA*, (Gray), *C. Diardii* of Dumeril and Bibron, *Emys Hasseltii*, Boie, and *Cyclemys orbicularis*, Bell : remarkable among the *CISTUDINES* for its flattened form and notched hind-margin of sternum.*

E. BLYTH.

* Capt. Berdmore has since sent a living specimen, from Schwe Gyen on the Sitang river, Pegu : colour of naked parts olive-grey, with longitudinal dull orange streaks on the neck, and a broader sincipital streak of the same. It is unusually quick in its movements, for a Tortoise ! He has also sent the curious lizard-tailed and large-headed Terrapin (*PLATYSTERNON MEGACEPHALUM*, Gray), heretofore only known from China ; and several living specimens of *EMYS OCELLATA*, Dumeril and Bibron ; and the very young of *EMYDA PUNCTATA*, Gray, (*Cryptopus granosus*, D. and B). *EMYS OCELLATA* would appear to be the commonest species in the Burmese rivers ; and its naked parts are olive-grey, the crown blackish, with a yellowish-white v-like mark over the snout, continued as a supercilium over each eye and back upon the neck ; another similar line behind the eye, and both are often more or less broken into spots. Carapax dusky, mottled with yellowish ; a great black spot surrounded with a pale *areola* upon each discoidal plate ; dorsal ridges blackish with pale border : and lower-parts wholly yellowish-white. Some are brighter-coloured than others ; and the *ocelli* become proportionally smaller as they increase in size. The carapax of our largest specimen measures 9 by 6 $\frac{1}{2}$ in. ; but it probably is not nearly full grown.

Presented.

Journal of the Royal Asiatic Society, vol. XVI. p. I.—By THE SOCIETY.

A Descriptive Catalogue of Historical MSS. in the Arabic and Persian Languages preserved in the Library of the Royal Asiatic Society of Great Britain, by W. Morley, *London* 1854, 8vo.—By THE SAME.

The Thirty-first Annual Report (for 1854) of the Royal Asiatic Society of Great Britain and Ireland, 8vo.—By THE SAME.

Mémoire sur les Noms Propres et les Titres Musulman, Par M. Garcin de Tassy, *Paris*, 1854, 8vo.—By THE AUTHOR.

Catalogue des Livres Imprimés et MSS. composant la Bibliothèque de feu M. E. Burnouf, *Paris*, 1854, 8vo.—By M. BENJAMIN DUPRAT.

Annales de la Société Linnéenne de Lyon, Années 1852-53.—By THE SOCIETY.

Mémoires de l'Académie Impériale des Sciences, Belles-Lettres et Arts de Lyon, vol. II.—By THE SAME.

Annales des Sciences Physiques et Naturelles, &c. de Lyon. Lyon, 1852, Tomes IV. and V.—By THE SOCIETY.

Opuscules Entomologiques par E. Mulsant, Nos. 2 to 4.—By THE AUTHOR.

Schiller's sämtliche Werke in zehn Bänden. *Stuttgart*, 1844.

Pertsch's Upalekha de Kramapátha Libellus, 6 copies.

Benfey's Hymnen des Sáma Veda. 8vo.

Benfey's Chrestomathie aus Sanskritwerken, 3 vols.

Wuttke's Geschichte des Heidenthums, 2 vols.

Gonul's Bibliotheca Tamulica. *Lipriq*, 1854, 8vo.

Duncker's Geschichte des Alterthums. *Berlin*, 1852, 2 vols.

The Atharva Veda, pp. 1 to 208.

Veteris Testamenti Aethiopici. Ed. A. Dillman. Tomus primus, fasciculus secundus.—By THE GERMAN ORIENTAL SOCIETY.

The Numismatic Chronicle and Journal of the Numismatic Society, Nos. 61 and 63.—By THE EDITOR.

Purchased.

Cowell's Prākṛita Prakāsa, *London*, 1854.

Smith's Dictionary of Greek and Roman Biography and Mythology, *London*, 1851, 3 vols. 8vo.

Blakesley's Herodotus, *London*, 1854, 2 vols. 8vo.

Crawford's Grammar and Dictionary of the Malay Language, *London*, 1852, 2 vols. 8vo.

Erskine's House of Taimur, *London*, 1854, 2 vols. 8vo.

Morton's Types of Mankind, edited by Nott and Gliddon, *Philadelphia*, 1854, 8vo.

D'Archiac's Description des Animaux fossiles du Groupe Nummulitique de l'Inde, *Paris*, 1853, 4to.

Vuller's Lexicon Persico-Latinum, Fasciculus III.

Burnouf's Lotus de la Bonne Loi, *Paris*, 1852.

Edinburgh Review, vol. 70.

Kosegarten's Poems of the Hozails, vol. I. p. 1, 4to.

Loudon's Magazine of Natural History, vols. I. and IV.

Greenough's Physical and Geological Map of India.

Weber's White Yajur Veda, part II. 20 copies.

Annals and Magazine of Natural History, 2nd series, vols. I. IV. VI. VII. VIII. IX. and XII.

Annals of Natural History, Nos. IV. to VI.

Meteorological Observations kept at the Residency, Lucknow, N. Lat. 26-51-18. Long. 81, for the Month of November, 1854.

Date.	At 6 A. M.				At 9 A. M.				Noon.				Aspect of Sky.	
	Thermometer		Force and direction of Wind.	Aspect of Sky.	Thermometer.		Force and direction of Wind.	Aspect of Sky.	Thermometer		Force and direction of Wind.	Aspect of Sky.		
	Wet Bulb.	Dry Bulb.			°	°			Wet Bulb.	Dry Bulb.				°
1	67	70	29.98	S. E. lt.	68	70	30.	E. lt.	70	73	29.96	W. lt.	Cumulo-strati.	
2	..	..	..	....	..	..	..	..	..	74	30.06	Ditto.	Strati.
3	..	..	..	....	..	..	..	..	..	71	30.	N. W. lt.	Cumuli.
4	69	71	30.	W. lt.	69	71	.14	N. W. lt.	71	75	29.98	Ditto.	Cirri.	
5	71	79	29.98	Ditto.	..
6	70	72	29.94	W. lt.	70	73	.02	W. lt.	..	..	..	..	..
7	65	68	.96	Ditto.	65	71	.02	S. W. lt.	..	..	..	..	..
8	62	67	30.02	S. lt.	..	..	..	..	64	76	30.02	W. lt.	Clear.
9	..	..	..	....	59	67	.12	W. lt.	..	..	..	..	..
10	55	62	.12	W. lt.	59	69	.25	Ditto.	63	75	.09	S. lt.	Ditto.	
11	..	..	..	....	..	..	..	..	59	73	.22	S. N. lt.	..
12	56	64	.8	E. lt.	..	..	..	..	61	70	.20	S. E. lt.	Clear.
13	58	62	.04	S. E. lt.	..	..	..	..	..	..	..	..	Cirri.
14	..	..	..	....	..	..	..	..	..	..	..	..	..
15	..	..	..	....	..	..	..	..	..	..	..	..	..
16	60	64	.04	S. E. lt.	63	65	.08	S. lt.	63	74	30.	S. lt.	Cirri.	
17	..	..	..	....	58	70	.15	Ditto.	62	74	18	Ditto.	Ditto.
18	53	60	29.98	W. lt.	..	..	..	S. W. lt.	..	..	..	..	..
19	..	..	..	....	..	..	..	..	..	..	..	..	..
20	53	59	30.02	W. lt.	..	..	..	..	..	..	..	..	..
21	53	57	.06	Ditto.	..	..	..	..	60	69	.12	W. lt.	Clear.
22	52	56	.08	Ditto.	..	..	..	..	59	69	.18	N. lt.	Ditto.
23	53	58	..	....	..	..	..	..	..	69	.18	E. lt.	Ditto.
24	57	60	.10	W. lt.	..	..	..	..	..	..	..	..	..
25	56	58	.08	Ditto.	..	..	..	..	61	70	.18	S. lt.	Clear.
26	56	59	.12	S. lt.	59	65	.24	S. W. lt.	..	..	..	..	..
27	58	60	.08	S. W. lt.	57	63	.20	W. lt.	61	70	.18	W. lt.	Clear.	
28	58	62	.05	W. lt.	60	65	.18	N. W. lt.	62	71	.14	N. W. lt.	Cloudy.	
29	56	58	.04	S. lt.	..	..	..	..	60	70	.08	Ditto.	..
30	55	58	.08	Ditto.	..	..	..	..	69	69	.18	S. E. lt.	Clear.
Total.	1222	1305	.91	....	808	886	.173	..	1078	1300	.195	..	....
Averg.	58.190	62.143	30.433	....	62.154	68.154	30.133	..	63.412	72.222	30.108	..	....

Meteorological Observations kept at the Residency, Lucknow. N. Lat. 26-51-18, Long. 81, for the Month of November, 1854

At 3 P. M.					At 6 P. M.				
Thermometer.		Force and direction of Wind.	Aspect of Sky.	Thermometer.		Force and direction of Wind.	Aspect of Sky.	Rain Gauge Inches.	Remarks.
Wet Bulb.	Dry Bulb.			Wet Bulb.	Dry Bulb.				
70	73	W. lt.	Cumulo-strati.	..	..	..	...	1.5	Light rain.
71	76	N. W. lt.	Cumuli.	71	75	29.95	Cumuli.	.1	
68	76	W. lt.	Cumuli.	69	74	.92	Clear.	.5	
64	76	Ditto.	Clear.	64	75	30.	Ditto.		
63	76	S. lt.	Ditto.	66	77	.04	Ditto.		
62	74	W. lt.	Ditto.	64	72	.1	Ditto.		
59	73	Ditto.	Ditto.	62	70	.18	Ditto.		
61	73	S. E. lt.	Ditto.	64	71	.14	Clri.		
..	..	S. E. lt.	Clear.	..	..	..	...
61	74	Ditto.	Ditto.	..	..	..	...
63	75	S. W. lt.	Clear.	..	..	..	...
..		
58	72	W. lt.	Clear.	..	..	..	...
57	72	Ditto.	Ditto.	..	..	..	...
61	70	W. lt.	Clear.	..	..	..	...
61	70	S. lt.	Clear.	61	68	.12	S. lt.		
60	70	S. W. lt.	Ditto.	61	67	.20	Ditto.		
..		
62	71	N. W. lt.	Cloudy.	..	..	..	...
..	..	..	...	60	69	.08	W. lt.		
..	..	..	...	60	68	.12	S. E. lt.		
..		
1001	1245	..	...	702	786	.76	...	1.11	
62.563	73.235	..	...	63.918	71.455	30.691	...	...

Abstract of the Meteorological Register for November, 1854.

Lucknow, 1st December, 1854.

Thermometer 6 A. M.			Thermometer 9 A. M.			Thermometer Noon.			Thermometer 3 P. M.			Thermometer 6 P. M.			Remarks.
Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	
Wet, ..	70	52	58.190	70	57	62.154	71	59	63.412	71	57	62.563	71	60	
Dry, ..	72	56	62.143	73	63	68.154	79	69	72.222	76	70	73.235	77	67	
Barometer 6 A. M.			Barometer 9 A. M.			Barometer Noon.			Barometer 3 P. M.			Barometer 6 P. M.			<p>The prevailing winds this month, W. & S. W. moderate. The weather generally speaking clear and pleasant. There have been a light shower of rain for 3 days 1, 2, and 4 to the extent of 2, 1. Mean Temperature of the month. Wet Bulb, 62.027. Dry, 69.442.</p>
Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	
30.80	29.94	30.433	32.25	30.02	30.133	30.22	29.96	30.108	30.20	29.92	30.811	30.20	29.92	30.691	

J. FAYRER, M. D., F. R. C. S.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April, 1855.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the cistern of the Standard Barometer above the level of the Sea, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempe- rature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o'
1	<i>Sunday.</i>							
2	29.783	29.872	29.720	0.152	85.1	96.4	75.9	20.5
3	.779	.860	.719	.141	84.6	95.2	76.4	18.8
4	.802	.885	.742	.143	85.4	94.6	79.6	15.0
5	.794	.876	.720	.156	83.4	93.8	75.8	18.0
6	<i>Good-fri day.</i>							
7	.781	.838	.725	.113	85.4	97.7	77.5	20.2
8	<i>Sunday.</i>							
9	.841	.920	.760	.160	86.1	96.8	79.6	17.2
10	.815	.886	.761	.125	84.6	93.4	77.8	15.6
11	.822	.892	.770	.122	84.6	93.2	78.4	14.8
12	.852	.935	.787	.148	85.2	93.8	78.4	15.4
13	.805	.901	.734	.167	83.5	93.0	77.4	15.6
14	.771	.850	.676	.174	84.3	95.2	76.0	19.2
15	<i>Sunday.</i>							
16	.801	.896	.712	.184	85.4	95.0	78.2	16.8
17	.773	.867	.672	.195	81.5	90.6	73.6	17.0
18	.727	.809	.670	.139	81.8	90.4	75.8	14.6
19	.728	.784	.674	.110	81.2	89.2	76.6	12.6
20	.721	.794	.620	.174	76.9	83.4	72.8	10.6
21	.725	.789	.630	.159	77.4	85.8	72.0	13.8
22	<i>Sunday.</i>							
23	.724	.798	.654	.144	70.7	76.6	66.0	10.6
24	.765	.845	.682	.163	74.9	84.8	67.6	17.2
25	.721	.788	.641	.147	79.5	87.6	71.2	16.4
26	.662	.720	.584	.136	81.5	90.2	75.0	15.2
27	.709	.789	.637	.152	81.5	91.2	74.0	17.2
28	.722	.795	.669	.126	84.7	92.8	79.8	13.0
29	<i>Sunday.</i>							
30	.711	.799	.640	.159	87.5	96.8	80.9	15.9

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April, 1855.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional weight of vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	<i>Sunday</i>							
2	76.5	8.6	72.2	12.9	.0781	8.33	4.24	0.663
3	76.5	8.1	72.4	12.2	.785	.39	.00	.677
4	76.1	9.3	71.4	14.0	.761	.12	.56	.640
5	77.6	5.8	74.7	8.7	.846	9.06	2.90	.758
6	<i>Good-fri day.</i>							
7	78.9	6.5	75.6	9.8	.871	.29	3.39	.733
8	<i>Sunday.</i>							
9	78.9	7.2	75.3	10.8	.862	.19	.76	.710
10	78.9	5.7	76.0	8.6	.882	.43	2.96	.761
11	79.6	5.0	77.1	7.5	.913	.76	.63	.788
12	80.2	5.0	77.7	7.5	.931	.94	.67	.788
13	77.0	6.5	73.7	9.8	.819	8.78	3.22	.732
14	77.3	7.0	73.8	10.5	.822	.78	.50	.715
15	<i>Sunday.</i>							
16	78.5	6.9	75.0	10.4	.854	9.12	.56	.719
17	75.7	5.8	72.8	8.7	.795	8.55	2.76	.756
18	77.1	4.7	74.7	7.1	.846	9.10	.30	.798
19	77.2	4.0	75.2	6.0	.860	.26	1.95	.826
20	74.2	2.7	72.8	4.1	.795	8.64	.22	.876
21	74.4	3.0	72.9	4.5	.797	.64	.37	.863
22	<i>Sunday.</i>							
23	69.0	1.7	68.1	2.6	.684	7.50	0.68	.917
24	71.6	3.3	69.9	5.0	.725	.90	1.38	.851
25	75.3	4.2	73.2	6.3	.806	8.71	.95	.817
26	78.4	3.1	76.8	4.7	.905	9.73	.58	.860
27	78.1	3.4	76.4	5.1	.893	.62	.69	.851
28	80.1	4.6	77.8	6.9	.934	.99	2.43	.804
29	<i>Sunday.</i>							
30	82.3	5.2	79.7	7.8	.992	10.55	.94	.782

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the Month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the Month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid-night.	29.775	29.903	29.698	0.205	78.4	82.2	69.6	12.6
1	.765	.859	.686	.173	78.1	82.2	69.1	13.1
2	.744	.829	.660	.169	77.5	81.9	68.1	13.8
3	.735	.830	.646	.184	77.3	81.6	68.0	13.6
4	.730	.835	.630	.205	76.8	81.0	67.6	13.4
5	.751	.846	.663	.183	76.7	80.9	67.6	13.3
6	.771	.865	.686	.179	76.4	81.0	68.0	13.0
7	.793	.889	.697	.192	77.0	81.8	67.8	14.0
8	.814	.912	.711	.201	79.3	84.4	68.3	16.1
9	.832	.935	.720	.215	81.6	87.2	66.0	21.2
10	.837	.935	.704	.231	83.9	89.2	66.9	22.3
11	.826	.923	.690	.233	86.4	92.2	71.1	21.1
Noon.	.801	.899	.665	.234	88.5	94.6	73.4	21.2
1	.773	.873	.624	.249	89.3	95.6	68.4	27.2
2	.748	.843	.610	.233	90.4	96.8	70.2	26.6
3	.720	.813	.595	.218	90.8	97.7	70.4	27.3
4	.708	.794	.584	.210	90.2	96.5	69.6	26.9
5	.697	.787	.593	.194	88.5	95.1	68.8	26.3
6	.708	.798	.611	.187	85.6	92.6	68.8	23.8
7	.728	.808	.633	.175	83.1	89.8	69.0	20.8
8	.743	.829	.651	.178	81.6	87.2	68.6	18.6
9	.770	.855	.681	.174	80.3	85.0	69.5	15.5
10	.779	.851	.693	.158	79.5	83.4	70.0	13.4
11	.779	.847	.693	.154	78.9	82.4	69.7	12.7

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Hour.	Mean Wet Bulb Thermo- meter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional Weight of Va- pour required for com- plete saturation.	Mean degree of Humidity complete saturation be- ing unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	75.9	2.5	74.6	3.8	0.843	9.13	1.18	0.886
1	75.7	2.4	74.5	3.6	.840	.11	.11	.891
2	75.3	2.2	74.2	3.3	.832	.04	.00	.900
3	75.4	1.9	74.4	2.9	.838	.10	0.88	.912
4	75.0	1.8	74.1	2.7	.830	.02	.81	.918
5	74.8	1.9	73.8	2.9	.822	8.93	.87	.911
6	74.7	1.7	73.8	2.6	.822	.93	.79	.919
7	75.3	1.7	74.4	2.6	.838	9.10	.79	.920
8	76.7	2.6	75.4	3.9	.865	.35	1.24	.883
9	77.4	4.2	75.3	6.3	.862	.29	2.05	.819
10	78.0	5.9	75.0	8.9	.854	.14	.99	.754
11	78.9	7.5	75.1	11.3	.857	.13	3.93	.699
Noon.	79.3	9.2	74.7	13.8	.846	8.97	4.91	.646
1	79.1	10.2	74.0	15.3	.827	.77	5.44	.617
2	79.4	11.0	73.9	16.5	.824	.70	.97	.593
3	79.4	11.4	73.7	17.1	.819	.66	6.18	.584
4	79.3	10.9	73.8	16.4	.822	.69	5.90	.596
5	78.6	9.9	73.6	14.9	.817	.66	.22	.624
6	78.2	7.4	74.5	11.1	.840	.98	3.78	.704
7	77.2	5.9	74.2	8.9	.832	.93	2.93	.753
8	76.8	4.8	74.4	7.2	.838	9.02	.32	.795
9	76.5	3.8	74.6	5.7	.843	.09	1.82	.833
10	76.3	3.2	74.7	4.8	.846	.14	.52	.857
11	76.1	2.8	74.7	4.2	.846	.16	.31	.875

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April, 1855.*

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the Sky.
	o	Inches.		
1 Sunday.		0.14	....
2	145.0		S. or S. W.	Cloudless till 10 A. M. scattered ☾ or ☾ or ☾ till 8 P. M. cloudless afterwards.
3	151.9		W. or S.	Cloudless till 7 A. M. scattered ☾ till 1 P. M. cloudless afterwards.
4	151.7		S. or N. E.	Cloudless.
5	144.2		S. or S. E.	Cloudless till 8 A. M. scattered ☾ and ☾ till 7 P. M. cloudless afterwards.
6 Good-fri day.			....
7	135.7		S. or S. W.	Cloudless till 5 A. M. scattered ☾ or ☾ till 5 P. M. cloudless afterwards.
8 Sunday.			....
9	153.5		S. S. E. or S. or S. W.	More or less cloudy till 4 P. M. cloudless afterwards.
10	139.0		S. or S. E.	Cloudless.
11	133.4		S. E. or S.	Cloudless till 7 A. M. various clouds till 7 P. M. cloudless afterwards.
12	140.0		S.	Cloudless till 5 A. M. more or less cloudy afterwards.
13	129.4		S. or N. E. or S. E.	Cloudy till 6 P. M. cloudless afterwards.
14	143.0		Calm or S. E.	Cloudless till 4 A. M. various clouds till 8 P. M. cloudless afterwards.
15 Sunday.			....
16	133.6		S. or N. E.	Cloudless till 5 A. M. scattered ☾ till 5 P. M. cloudless afterwards.
17	133.8	0.14	N. E. or S. E.	More or less cloudy the whole day.
18	133.0		S. E. or N. W. or S.	Cloudless till 4 A. M. more or less cloudy afterwards, also drizzling at 8 P. M.
19	..		S. or S. W.	Cloudy nearly the whole day. Also drizzling from 2 P. M. to 4 P. M.
20	120.0	0.65	S. or S. E.	Cloudy and constantly drizzling.
21	..	0.36	S. or S. E.	Cloudy, also raining from 4 P. M. to 8 P. M.
22 Sunday.		2.20	....
23	..		E. or S. E. or S. W.	Scattered ☾ till 6 A. M. cloudy afterwards, also drizzling between 9 and 10 A. M.
24	125.0		[or s. s. w. s. w. or N. w. or S. E.	Various clouds the whole day.
25	128.2		S. E. or S.	Cloudless till 7 A. M. scattered ☾ or ☾ afterwards.
26	..	0.34	S. or E. or S. W.	Cloudy till 7 P. M. cloudless afterwards.
27	136.0		s. e. or N. E. or W. or N.	More or less cloudy till 6 P. M. cloudless afterwards.
28	135.5		E. or N. E.	Cloudless till 2 A. M. cloudy till 6 P. M. cloudless afterwards.
29 Sunday.			....
30	134.0		S. E. or S.	Cloudy till 10 A. M. cloudless afterwards.

☾ Cirri, ☾ Cirro-strati, ☾ Cumuli, ☾ Cumulo-strati, ☾ Nimbi, —i Strati,
☾ i Cirro-cumuli.

Meteorological Observations kept at the Residency, Lucknow. Lat. 26-51-18, Long. 81, for the Month of October, 1854.

Date.	At 6 A. M.				At 9 A. M.				Noon.			
	Thermometer.		Force and direction of Wind.	Aspect of Sky.	Thermometer.		Force and direction of Wind.	Aspect of Sky.	Thermometer.		Force and direction of Wind.	Aspect of Sky.
	Wet Bulb.	Dry Bulb.			Wet Bulb.	Dry Bulb.			Wet Bulb.	Dry Bulb.		
1	77	79	29.78	Caln.	77	83	29.86	S. E. lt.	77	85	.82	S. E. lt.
2	76	78	.80	Ditto.	77	85	.95	S. E. lt.	76	85	.92	Ditto.
3	75	77	.85	Clear.	77	85	.95	S. E. lt.	75	86	.92	S. E. lt.
4	75	77	.85	Clear.	78	84	.96	S. lt.	75	86	.92	Cumuli.
5	77	81	.90	S. E. lt.	79	85	.96	S. E. lt.	80	86	.92	Cumuli.
6	78	80	.88	Ditto.	77	80	.90	Ditto.	80	84	.87	Cumulo-strati.
7	77	79	.82	Ditto.	77	80	.88	N. W. lt.	80	86	.96	Cumuli.
8	78	77	.82	Clear.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
9	77	80	.92	E. lt.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
10	77	80	.92	Clear.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
11	78	80	.94	Cirri.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
12	76	80	.88	Ditto.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
13	73	77	.90	S. W. lt.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
14	73	75	.94	Ditto.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
15	70	73	.98	Ditto.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
16	65	72	.94	Ditto.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
17	63	69	.92	Ditto.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
18	63	70	.92	Ditto.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
19	65	69	.86	Ditto.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
20	66	69	.92	Ditto.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
21	70	73	.98	S. E. lt.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
22	70	73	.98	Ditto.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
23	70	75	.98	Ditto.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
24	70	75	.98	Ditto.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
25	69	74	.30	Clear.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
26	65	71	.95	Ditto.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
27	62	70	.90	W. lt.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
28	59	68	.95	Ditto.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
29	61	66	.30	S. W. lt.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
30	64	68	.30	S. E. lt.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
31	70	74	.30.05	Ditto.	82	83	.96	S. E. lt.	80	86	.92	Cumuli.
Total.	1897	2006	2118	..	1353	1494	955	..	1292	1488	.853	..
-Avg.	70.259	74.296	29.784	..	71.210	78.632	29.526	..	71.777	82.666	29.474	..

Meteorological Observations kept at the Residency, Lucknow. Lat. 26-51-18, Long. 81, for the Month of October, 1854.

At 3 P. M.										At 6 P. M.			
Thermometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.	Barometer.	Force and direction of Wind.	Aspect of Sky.	Rain Gauge Inches.	Remarks.		Thermometer.	Barometer.	Force and direction of Wind.	Aspect of Sky.
Wet Bulb.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	Dry Bulb.
76	80	S. E. lt.	Clear.	..	..	..	..	..	..	..	..	..	..
76	87	S. E. lt.	Cumuli.	76	85	S. E. lt.	Clear.	..	..	..	..	..	..
75	87	S. E. lt.	Cumuli.	75	85	S. E. lt.	Clear.	..	..	..	..	..	..
77	87	S. E. lt.	Ditto.	77	85	S. E. lt.	Ditto.	..	..	..	..	..	..
77	81	S. E.	Strat: rain.	76	77	S. E.	Strat: rain.	..	..	..	..	..	..
..	..	..	..	76	77	..	..	..	..	..	..	..	..
80	86	S. E. lt.	Cumuli.	80	85	S. E. lt.	Clear.	..	..	..	..	..	..
..	..	..	..	80	86	S. E. lt.	Clear.	..	..	..	..	..	..
..	..	..	..	76	85	S. W. lt.	Clear.	..	..	..	..	..	..
73	85	S. W. lt.	Clear.	74	85	S. W. lt.	Ditto.	..	..	..	..	..	..
..	..	..	..	74	83	..	..	..	..	..	..	..	..
..	..	..	..	71	80	..	..	..	..	..	..	..	..
66	82	W. lt.	Clear.	68	79	W. lt.	Clear.	..	..	..	..	..	..
68	82	Ditto.	Ditto.	68	79	W. lt.	Clear.	..	..	..	..	..	..
66	82	W. lt.	Clear.	..	..	..	..	..	..	..	..	..	..
67	80	N. W. lt.	Ditto.	72	80	E. lt.	Clear.	..	..	..	..	..	..
..	..	..	..	72	80	..	..	..	..	..	..	..	..
..	..	..	..	72	81	S. E. lt.	Clear.	..	..	..	..	..	..
..	..	..	..	69	81	S. E. lt.	Clear.	..	..	..	..	..	..
69	83	S. E. lt.	Cumuli.	69	81	S. E. lt.	Clear.	..	..	..	..	..	..
..	..	..	..	64	76	W. lt.	Clear.	..	..	..	..	..	..
63	79	S. W. lt.	Clear.	66	77	S. W. lt.	Ditto.	..	..	..	..	..	..
65	79	S. lt.	Ditto.	..	..	..	..	..	..	..	..	..	..
69	80	S. E. lt.	Cirro-Cumuli.	..	..	..	..	..	..	..	..	..	..
70	73	E. F.	Heavy rain.	..	..	..	..	..	..	..	..	..	..
1137	1313	1124	..	1093	1225	1057	..	..	..	1.25	..	..	..
71.063	82.063	29.703	..	72.867	81.667	29.705	..	..	..	..	..	..	..

Abstract of the Meteorological Register for October, 1854.

Lucknow, 1st November, 1854.

Thermometer 6 A. M.			Thermometer 9 A. M.			Thermometer Noon.			Thermometer 3 P. M.			Thermometer 6 P. M.			Remarks.
Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	
Wet, 78	59	70.259	82	62	71.210	80	61	0 71.777	80.0	63.0	71.063	80.0	64.0	72 867	Prevailing winds this month, W. and S. E. but always Light. The aspect of the Sky for the greater portion of the month clear. The weather pretty fair, and pleasant. The rain fell on 3 days only. Total quantity of rain 1 25. Mean temperature of the month, Wet Bulb, . . . 71.435. Dry, 79.865.
Dry, 81	66	74.296	85	72	78.632	87	0 73	0 826	66 87	0 73.0	82.063	86.0	76.0	81.667	
Barometer 6 A. M.			Barometer 9 A. M.			Barometer Noon.			Barometer 3 P. M.			Barometer 6 P. M.			
Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	
30.05	29.78	29.784	30.10	29.79	29.526	30.08	29.82	29.474	30.06	29 80	29.703	30.02	29.80	29.705	

J. FAYRE, M. D F. R. G. S.

Meteorological Observations kept at the Residency, Lucknow. Int. 26-51-18, Long. 81, for the Month of December, 1854.

Date.	AT 6 A. M.				AT 9 A. M.				Noon.			
	Thermometer.		Force and direction of Wind.	Aspect of Sky.	Thermometer.		Force and direction of Wind.	Aspect of Sky.	Thermometer.		Force and direction of Wind.	Aspect of Sky.
	Wet Bulb.	Dry Bulb.			Wet Bulb.	Dry Bulb.			Wet Bulb.	Dry Bulb.		
1	57	60	30.12	Clear.	62	65	30.2	Rain.	61	69	30.20	Clear.
2	62	64	.15	Strati-rain.	59	62	.14	Clear.	63	69	.12	Cirri.
3	59	62	.06	Clear.	59	62	.14	Clear.	62	69	.12	Cumul.
4	58	60	.08	Ditto.	59	62	.14	Clear.	..	..	..	..
5	..	..	..	..	..	..	..	..	..	..	..	..
6	57	61	.12	Cirri.	59	65	.22	Cumul.	..	..	..	..
7	56	59	.06	Ditto.	59	65	.22	Cumul.	..	..	..	..
8	54	57	.02	Clear.	58	63	.14	Clear.	59	67	.14	S. E. lt.
9	53	56	.05	Ditto.	57	62	.15	Ditto.	58	67	.12	S. E. lt.
10	57	59	.10	Cirri.	57	62	.15	Ditto.	59	66	.16	Ditto.
11	55	59	.11	Clear.	57	62	.25	Ditto.	61	69	.15	Ditto.
12	54	59	.20	Ditto.	56	61	.24	Ditto.	58	68	.26	Ditto.
13	55	58	.16	Cirri.	55	60	.24	Ditto.	..	..	..	..
14	57	61	.18	Clear.	60	63	.22	Clear.	58	68	.26	Cirri.
15	57	60	.06	S. W. lt.	59	65	.16	Ditto.	63	71	.20	Clear.
16	53	58	.02	Ditto.	..	..	..	..	..	..	..	..
17	51	56	.05	Ditto.	54	61	.14	Clear.	..	..	..	..
18	..	..	..	..	53	59	.15	Ditto.	..	..	..	..
19	..	..	..	..	54	59	.08	Ditto.	..	..	..	..
20	50	53	29.96	Hazy.	..	..	..	..	55	67	.12	Clear.
21	50	53	30.02	Ditto.	..	..	..	..	..	..	..	..
22	53	55	.04	Clear.	56	61	.16	Clear.	56	65	.12	S. W. lt.
23	53	55	.08	Ditto.	58	62	.12	Ditto.	58	66	.15	S. E. lt.
24	58	59	.08	S. E. lt.	57	60	.18	Ditto.	59	68	.10	Ditto.
25	55	59	.05	S. W. lt.	61	68	.14	Ditto.	..	..	..	..
26	52	57	.04	Cirri-cumul.	..	..	..	..	..	..	..	..
27	..	..	..	Clear.	54	61	.1	S. E. lt.	..	..	..	..
28	53	58	.5	..	..	..	..	..	55	66	.12	Clear.
29	52	56	.4	Clear.	..	63	.3	S. lt.	57	68	.4	S. E.
30	53	55	.3	S. lt.	56	60	.2	W. lt.	56	67	.3	S. W.
31	54	57	.5	Clear.	52	68	.1	S. lt.	55	66	.2	S. lt.
					55	64	.2	W. lt.	56	65	.1	Ditto.
Total.	1478	1566	288.	..	1249	1438	299	..	1169	1319	.262	..
Average.	54.714	58.000	30.107	..	56.773	62.522	30.130	..	58.450	67.450	30.131	..

Meteorological Observations kept at the Residency, Lucknow. Lat. 26-51-18, Long. 81, for the Month of December, 1854.

At 3 P. M.					At 6 P. M.						
Thermometer.		Time of day.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Barometer.	Force and direction of Wind.	Aspect of Sky.	Rain Gauge Inches.	Remarks.
Wet Bulb.	Dry Bulb.				Wet Bulb.	Dry Bulb.					
..		
62	70	30.12	W. lt.	Clear.	..	..	..	..	....
..		
60	68	.15	S. E. lt.	....	61	66	30.12	S. E. lt.	Clear.		
..		
58	68	.12	S. lt.	Clear.	..	..	..	..	....
..		
..		
59	69	.22	W. lt.	Clear.	..	..	..	..	....
63	72	.15	W. fresh.	Cirri.	..	..	..	..	....
60	70	.1	W.	Ditto.	..	..	..	..	....
..		
55	58	.11	W. F.	Clear.	..	..	..	..	....
55	67	.12	..	Ditto.	..	..	..	..	....
..		
56	67	.08	S. W. lt.	Cirri.	..	..	..	..	....
59	66	.12	S. E. lt.	Ditto.	..	..	..	..	....
59	67	.08	Ditto.	Clear.	..	..	..	..	....
..		
58	69	.12	..	Clear.	59	65	30.0	W. lt.	Clear.		
..		
56	68	.08	W. lt.	Cirri.	..	..	..	..	....
..		
58	70	.7	S. E.	Clear.	61	68	30.9	W. lt.	Clear.		
59	69	.5	Ditto.	Ditto.	67	68	30.5	W.	Ditto.		
57	68	.4	Ditto.	Ditto.	66	67	36.4	Ditto.	Ditto.		
58	67	.3	S. lt.	Ditto.	..	..	..	..	....
991	1163	.167	..	....	314	334	.30	..	....		....
58.294	68.412	30.982	..	....	62.800	66.800	30.600	..	....		..

Abstract of the Meteorological Register for December, 1854.

Lucknow, 1st January, 1855.

Thermometer 6 A. M.			Thermometer 9 A. M.			Thermometer Noon.			Thermometer 3 P. M.			Thermometer 6 P. M.			Remarks.
Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	
Wet,...	62.0	50.0	54.714	62	52.0	56.773	63.0	55.0	58.450	63.0	55.0	58.294	67.0	59.0	
Dry,...	64.0	53.0	58.00	68.0	59.0	62.522	71.0	65.0	67.450	72.0	66.0	68.412	68.0	65.0	
Barometer 6 A. M.			Barometer 9 A. M.			Barometer Noon.			Barometer 3 P. M.			Barometer 6 P. M.			The prevailing winds this month, S. and S. E. but frequently variable. The weather pretty clear, now and then hazy and cloudy. No rain during the month. Mean temperature of the month. Wet Bulb,..... 58.206. Dry do. 64.637.
Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	
30.18	29.96	30.107	30.30	30.08	30.130	30.40	30.10	30.131	30.70	30.8	30.982	30.90	30.0	30.60	

J. FAYRE, M. D. F. R. G. S.

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No. VI.—1855.

On the Coins of the GUPTA Dynasty.—By EDWARD THOMAS, Esq.,
B. C. S.

Of the numerous coins, contributed by India at large, so admirably delineated by James Prinsep, and published in the early volumes of the Journal of the Asiatic Society of Bengal, the great majority were either conclusively deciphered and attributed by that versatile scholar, or advanced some stages towards such eventual explication and assignment. One of the few exceptions to this, almost unvarying success, presents itself in the class of money, I am now about to notice.

I refer to the small silver coins with the *reverse* device of a Peacock* of the type associated with the recognised Saurashtran model.

Prinsep, while he correctly classed these pieces, in virtue of their typical assimilations, freely admitted that he was unable to master their legends; neither has Professor Wilson afforded us any assistance in this direction, as none of these coins formed part of the collection of Mr. Masson, to the description of which the "*Ariana Antiqua*" was specifically devoted.

In the year 1848, I had occasion to advert incidentally to this series of Indian mintages, and on examination, detected the name of BUDHA GUPTA amid the imperfectly outlined letters of their le-

* J. A. S. B. III. Pl. XVIII. fig. 20, p. 230. Vol. IV. Pl. XLIX. figs. 10, 11, 12, p. 687.

gends.* In this state I allowed the enquiry to rest, until my attention was recalled to the subject by the discovery of a coin of a similar description in the ruins of the Sarnâth monastery by Professor Fitz E. Hall.† As in the progress of collecting, my own cabinet had by this time become enriched with new specimens of the type, and as I had the immediate advantage of access to Col. Stacy's ample collection, I was able by a careful collation of the isolated characters of the several varieties to identify the names and titles of three monarchs of the race of the Gupta Kings of Allahabad and Bhitâri lât renown, whose gold currency is conspicuous in the various groups of the heretofore denominated "Canouj series."

* J. R. A. S. XII. 70, Pl. II. figs. 55, 57.

† But I have other obligations to acknowledge; to Mr. Hall I am indebted for explanations and assistance upon all doubtful or difficult interpretations of Sanscrit legends and inscriptions.

I myself pretend to the most limited knowledge of that language. I indeed, present the apparent paradox of being able to read and transcribe with precision, that which I only imperfectly understand, and it has happened thus; scholastic requirements taught me *Bengali*—intimate official intercourse, of five years' duration, with a people who wrote in *Hindi*, instructed me in all the modifications of that alphabet, from the polished penmanship of the brâhman and the current hand of the recorder of evidence, to the quaint contracts of village communities, and the crude writing of the ignorant, who, distrustful ever, would allow no foreign hand to tell their tale. The vehicle of expression varied almost in a like degree, from the glazed surface of the gold-spangled *Khurîtah* to the petition of the northern Bho-tias on their time-honored Birch-bark!

Thus broken in, Prinsep's Ancient Alphabets came to me as an earlier style of English might have done—thereafter, I gathered, as I went, such information as was necessary for my passing purpose; but, as Indian Numismatics did not exclusively occupy my attention, I abstained from devoting my time to acquiring a language that seemed likely to be of no other use to me.

Thanks have I too—and many—to return for the kindly aid of one, an almost stranger to myself, but united in devotion to our common cause, that most promising young numismatist, G. H. Freeling, Esq. C. S.

Whatever of novelties his already rich cabinet could boast of either in this or in other departments, have always been freely and unreservedly placed at my disposal. To Major Bush (24 N. I.) likewise my cordial acknowledgments are due for the liberal manner in which he at all risks, has forwarded for my examination his entire Gupta and Saurashtran series!

Before proceeding to notice these new silver coins,* it occurs to me, that it may be useful to enter upon a descriptive synoptical view of the entire suite of the Gupta mintages, exhibiting the various published types in serial order, and introducing, as opportunity may offer, any novelties that have become known, since the last article on the subject appeared in this Journal.† Moreover some such systematic classification is clearly demanded in this place, as not only are all previous notices of these coins scattered in detached numbers of the Journal, or inserted in other independent works, but our latest contributions necessitate a modification of the serial arrangement of the coins themselves, as well as amended appropriations of some of their numbers to the separate monarchs of the line.

I fear that I must claim indulgent consideration for the many imperfections of this article, for not only was the greater part of it the result of an after-thought, but when that portion was already prepared, new coins continued to pour in upon me even to the last, so that alteration and amendment had to proceed *pari passu* with the influx of fresh materials, possibly to the serious damage of some sections previously written and forwarded to the printers: add to this, my own contemplated departure from this country has prevented either my recasting this descriptive catalogue, or bringing it to a satisfactory completion in its most important aspect—the due and full explanation of the recently deciphered legends, the first transcript of which time has barely admitted of my submitting to Professor Hall, without the possibility of any further discussion or renewed reference to originals in doubtful cases.

The recorded Gupta Kings number nine, succeeding in the following order :—

I. Sri Gupta.

II. Ghatot Kacha

III. Chandra Gupta 1st.

IV. Samudra Gupta.

V. Chandra Gupta 2nd.

VI. Kumára Gupta.

VII. Skanda Gupta.

VIII. Mahendra Gupta ?†

and after an interval Budha Gupta.

* J. A. S. B. IV. Pls. XXXVIII. and XXXIX. Vol. V. Pls. XXXVI. and XXXVIII.

† J. A. S. B. V. 643, and VI. 319.

‡ My faith in the sufficiency of the identification of Mahendra Gupta as the

The data for this list will be found under the following references :

- I. *Allahabad* lāt, second Inscription (J. A. S. B. iii. 257 and vi. 969.)* “II. Mills” *Bhitāri* lāt Inscription (J. A. S. B. VI. 1.) III. 2nd Skanda Gupta Inscription *Kuhaon* pillar (J. A. S. B. VII. 37.) IV. The partially deciphered Skanda Gupta Inscription on the Rock at *Junagad* in Guzrat (J. A. S. B. VII. 348,) and new transcript of the same writing (Journal Bombay Branch Roy. As. Soc. April, 1842;) V. Chandra Gupta Inscription on the eastern gate of the Buddhist Tope at *Sanchi* near Bhilsa (J. A. S. B. VI. 455.) Udayagiri ditto “Bhilsa Topes” p. 151.† VI. Budha

successor of Skandha Gupta is based rather upon his coins, which seem naturally to follow suit, than upon the record on the Bhitāri lāt regarding which, Professor Mill remarks as follows: “This worthy worshipper of SIVA and DUARGA [Skanda Gupta] ascends to heaven: and his brother and the other chiefs, with mingled feelings of grief and affectionate allegiance proclaim his young child the heir to his father’s crown and conquests. This youth is described as obedient to the Queen dowager his mother, as was Crishna to his mother Dévakī; but the part of the inscription that proceeds to speak of him is confused and unintelligible; neither does he appear to be once named; unless we conceive some letters of line eighteen to give his name thus: MAHESA-PRITI-GUPTA, (*the Gupta attached to Siva or beloved by Siva.*) He is probably the Mahendra Gupta whose name occurs in several of the newly discovered coins of this dynasty.” (J. A. S. B. VI. 8.)

Major Cunningham suppresses MAHENDRA GUPTA altogether, though he does not assign his reasons for so doing, but in compensation he gives us two SKANDA GUPTAS, the second of whom he distinguishes by the title of *Lagraditya* or *Lokaaditya*, making him succeed directly after the great SKANDA GUPTA for whom he reserves the title of *Kramaditya*! (Bhilsa Topes, 141.)

* Since the publication of my previous remarks on the *Daiva putra Shahi* of the Allahabad column Inscription (No. V. p. 389) I have had an opportunity of examining that monument, and have satisfied myself that the correct reading is **देव पुत्र षडि षडान षडि**

† Major Cunningham, in his work on the Bhilsa Topes has given a facsimile as well as an English transcript and translation of this Inscription: the two latter are as follows :

“Siddham samvatsare 82 Sravana-māsa suklekadasya”

“Parama-Bhattāraka Mahārājadhi CHANDRA GUPTA pādā na dā ta sya.”

“Mahārāja Chagaliga potrasya, Mahārāja VISHNU-DĀSA putrasya.”

Sanakānikāsya Mahā (rāja * * *)

“Finished in the year 82, on the 11th of the bright half of the month of Srā-

Gupta Inscription on the Pillar at *Eran* near *Ságor* J. A. S. B. VII. 632.

I would premise, in introducing the following recapitulation, that I have indicated the doubtful readings of legends by the use of Roman type; where the transcript is given in Sanscrit letters, it is to be understood, that the decipherment is not contested. In the supplementary observations appended to each classified exemplar, the latter character is also employed, as being most readily identifiable with the indeterminate originals.

GHATOT KACHA

CLASS A.—J. A. S. B. V. XXXIV. 12. *Ariana Antiqua* XVIII. 14.*

Obverse. Full length figure of the King, clothed somewhat after

vana; [the cave] of him, bowing to the feet of the paramount, homage-receiving, Supreme Mahārāja CHANDRA GUPTA the grandson of Mahārāja CHAGALIGA, the son of Mahārāja VISHNU-DĀSA, Mahārāja (name obliterated of Sanakánika." p. 15."

As I do not place much faith in Major Cunningham's Sanscrit lore, I have submitted an independent transcript of his original Facsimile Pl. XXI. (Bhilsa Topes) to the scrutiny of Professor Hall, who has kindly favoured me with an amended translation.

The transcript finally adopted will be seen to vary but slightly, from the version in Roman type inserted above. The translation however differs very materially—at the same time I must freely admit the disadvantages I have laboured under in having to follow the Lithograph of a London Artist while Major Cunningham's transcript has been made, I presume, from the original record. Some slight liberties have also been taken by Mr. Hall in correcting, in the modern version, the errors of Sanscrit orthography to be detected in the ancient text.

सिद्धम् ॥ संवत्सरे ८२ आवस्य मासे शुक्लैकादश्यां परममहाराज महाराजवि (राज) श्रीचन्द्रगुप्तपदामुद्यातस्य महाराज चगलिग पौत्रस्य महाराज विष्णुदास-पुत्रस्य सनकानिकस्य महाराज-

("May it be) auspicious! On the 11th day of the light fortnight, in the month of Srávana, in the year 82 of — the great King of Sana Kánika, son of the great King, Vishnu-dasa, (and) grandson of the great King, Chhagaliga, (who, viz. Chhagaliga was) son of the supreme monarch (and) paramount lord of great Kings The auspicious Chandra Gupta * *!"

* Coins known to the author, 1st, Tregear (No. 12, above,) 2nd, the late Lord Auckland, 3rd, British Museum, 4th, Col. Stacy, 5th, Major Bush.

the fashion of the Indo-Scythians, the right hand is extended towards a small Mithraic altar, the left clasps the symbol standard of the moon.*

LEGEND "Kama-naruttam-ja GHA (TOT) KACHA. Son of an excellent man resembling Kama, Ghatot Kacha. [Prinsep V. 645.]

Under the left arm { क
च

Reverse. Female figure erect, holding a flower in the right hand, and supporting a Cornucopia on the left arm. The latter is supposed to identify the figure with the Parvati of the ΑΡΔΟΚΡΟ. *Reverse* of No. 9, Pl. XXXVI. Vol. V. and No. 9, of XXXVIII. Vol. IV. Monogram Variant of 155. Ariana Antiqua.†

LEGEND—सर्वराजेश्वर. The exterminator of all Rājas.

My collated decipherment of the obverse marginal legends gives the following result.

कर्मभिरत्तमैर्जय कचोऽमुमवजिद्य ?

Professor Hall suggests,

कर्मभिरत्तमैर्जयति कचोऽमुमवजिद्य ?

"Kacha, having overcome Ansu, reigns by virtue of excellent deeds."

* J. A. S. B. IV. 375. Harsha Inscription XVIII. "By whom was placed on the top of the house of SIVA, his own appropriate emblem, the golden figure of a full moon."

† The monogram in the three coins which have not been engraved in the Journal Asiatic Society Bengal, differs slightly from the form to be seen in fig. 12 above cited. Professor Wilson, in adverting to the general subject of Gupta monograms, offers the following observations.

"There is also another remarkable proof of the connexion [between the Gupta and the Mithraic series,] in the use of the same monogram that is found upon the coins of Soter, Megas, Kadphises and Kanerki. Agreeably to the purport which there seems reason to assign to these monograms, the recurrence of this emblem on all these coins should denote the place of their coinage; but, as above observed, we have no reason to place these princes on the west any more than we have to bring the Indo-Scythians far to the east of the Indus. It is therefore, perhaps, merely a proof of imitation, and has been introduced without any definite object. It is of use, however, in addition to other resemblances, as evidence that the coins of the Gupta princes succeeded immediately to those of the Mithraic prince.." (A. A. 418.)

Ansu is probably *Asu* as there is no sign of the *Anuswāra* on the coins.

There is a letter I have been unable to identify after the concluding ः of the above transcript, which as far as mere forms go represents अ or ँ.

The name of Kacha in the field has a long ञ over the upper consonant.

In the present state of the enquiry, I abstain from any comments on the import of this obverse legend, which promises, if correctly rendered, to throw much light on the Gupta epoch in demonstrating more palpably whom this race conquered and whom they succeeded.

In regard to the reverse device, I may remark that Professor Wilson does not appear to have concurred in Lassen's* interpretation of the term ΑΡΔΟΚΡΟ, as *Ardh-Ogro* half Siva, i. e. *Parvati*. He has not, however, directly contested the determination and under another form almost countenances such an association in speaking of the figure on the Kadphises coins as that of "Siva and his spouse in their composite character of *Arrdha-nāriswarā*, Siva half-feminine."†

The exhibition of Parvati,‡ on their coins may be felt to be somewhat inconsistent with the Vaishnavi tendencies of the early Guptas, and is still more opposed to any notion of the Buddhist faith, the author of the Bhilsa Topes would claim for them;§ but, as Professor Wilson has observed, the adoption of this device may well have been a mere act of "imitation of a foreign design" irrespective of any aim at demonstration of creed; I myself have for long past contended, that more weight ought to be allowed, in estimating the significance of *Reverse* types—to local usage, and that their appropriation was ruled rather by the division of the country to which they at times became special, than to any question of the faith of the adopting dynasty. Striking examples of the disregard of the typical significance of devices, conjoined with an equal respect for national conventionalities may be cited almost on the same ground,

* J. A. S. B. 1840, p. 455, A. A. 361, 366, &c.

† A. A. 351.

‡ Num. Chron. VI. 20 —J. A. S. B. 1845, p. 437.

§ Bhilsa Topes, p. 157.

in the Sassanian retention of the identical Siva and Nandi, reverse of Kadphises* and in later days of the Ghaznavi maintenance unchanged of the Recumbent Bull of the Hindus on the Moslem coinage of Láhore.†

The recognition of this ΑΔΟΚΡΟ figure as one of the forms of Parvati is conclusively set at rest by her appearing elsewhere as Durga seated on the lion, as well as by the subsequent modifications introduced on the Gupta reverse devices, where her form appears in association with the Peacock‡ primarily sacred to herself "and by her presented to her son *Kumára*," the Indian Mars,§ whose identity as that Hindu divinity is further manifested by the adoption of his second title of *Skanda* into the kingly nomenclature of the Guptas.||

It is necessary to advert for a moment to the variety in the types of the monograms on these coins. Those of Col. Stacy and Major Bush have the same symbol as the Ariana Antiqua piece, No. 14, Pl. XVIII. Prinsep's specimen, again, differs from these, in its two circular ornaments below the cross-bar, while its lower portion is

* Num. Chron. XV. 4.

† J. R. A. S. IX. 349.

‡ J. A. S. B. IV. Pl. XXXIX. figs. 28, 30. A. A. XVIII. 13.

§ Tod, I. 595.

|| Col. Tod in speaking of the various forms of Parvati adds the following comprehensive remarks on the subject :

" This Isis of the Suevi * * the Búdha and Ella of the Rajpoots ; in short, *the earth*, the prolific mother, the Isis of Egypt, the Ceres of Greece, the Annapurana (*giver of food*) of the Rajpoots * * * Gunga, *the river goddess*, like the Nile, is the type of fertility * * has her source amidst the higher peaks of the gigantic Himalya, where Párvati is represented as ornamenting the tiara of Iswara ' with a beaming moon.'

" The mysteries of Osiris and those of Eleusis were of the same character, commemorative of the first germ of civilization, the culture of the *earth*, under a variety of names Ertha, Isis, Diana, Ceres, Ella. With the [Buddhists] the beneficent *Lacshmi*, *Sri*, or *Gauri*, is an object of sincere devotion * * such is the affinity between the mythology of India, Greece and Egypt, that a bare recapitulation of the numerous surnames of the Hindu goddess of abundance would lead us beyond reasonable limits ; all are forms of *Párvati*, or *Durgá Mátá*, the Mater Montana of Greece and Rome, p. 574 to 576, Vol. I."

completed by a perpendicular line. Mr. Freeling's coin further modifies the arrangement adopted in this last, by introducing a third circle in place of the vertical line. Simultaneously with these distinctions is to be noted the difference in the forms of that striking test letter ऋ m. in the several legends; on the first cited pieces it is shaped like the ordinary Gupta ऋ of the Allahabad and other inscriptions, while on the latter it affects the form of the oldest type of the character, which retained its original identity in Western India to so much later a date.* The evidence of inscriptions seems to indicate that Bhilsa was one of the touching points of the two systems of writing at all events as regards this particular letter, as we find the Sauchi Inscriptions of Chandra Gupta† using the western character while other monuments of proximate locality employ modifications of the Gupta style of the letter.‡

The evidence of the inscriptions is also valuable in regard to the provincial forms of the र, a reference to which is necessary as justificatory of the reading of the suffix to that letter on the coins under consideration.

The western system of writing continued the vertical down stroke of the character by a backward turn, and the same practice is followed in finishing the perpendicular line of the क.§ The eastern Inscriptions, on the other hand, exhibit the र as a simple unswerving stroke from the mátrá; and the vertical portion of the क is, in like manner, wanting in the foot curve.|| The two coins above noticed, which use the eastern form of क and ऋ, give the र a curve similar to the western type of that letter in order to express र, and the coins which affect the western style of writing define the र by a double curve in the opposite direction to that followed by the ordinary linear completion of the local form of the simple letter.

* Wathen's Plates, J. A. S. B. IV. 476.

† J. A. S. B. VI. 455.

‡ Eran Inscriptions, J. A. S. B. VII. 632 and 634.

§ Sáh Insan. VII. Pl. XV. Chandra Gupta *Bhilsa* VI.—Pl. XXV. Udayagiri Bhilsa, Topes," Pl. XXI. Wathen, IV. Pl. XL.

Allahabad, Bhitari, Kuháon, Budha Gupta, Toramána.

CHANDRA GUPTA 1st.

CLASS A. 1. J. A. S. B. V. XXXVIII. 7, A. A. XVIII. 1. No. 1, (Freeling) weight 121 grains.

Obverse. The King standing erect, his left hand rests upon his *Khanda*, or straight sword, while his right is advanced in the act of casting incense on the usual miniature Scythic altar. A *Chattah*, the Indian emblem of sovereignty, overshadows his head. The attendant introduced below his left arm grasps the staff of the umbrella.

LEGEND. व ? क ? मादित्य क्षितिमवजित्य शवरः

Mr. Hall proposes to read

‘ विक्रमादित्यः क्षितिमवजित्य समरे

, Vikramāditya, having conquered the earth in battle.”

Reverse. Female figure, similar to that in *Class A.* with the exception that the left hand holds the flower, while the right extends a regal fillet. Monogram No. 159, A. A.

.. LEGEND. विक्रमादित्यः *Vikramāditya*, No 2, wt. 121 gr.

VARIANT. A second coin, also in the possession of Mr. Freeling, contributes the concluding portion of the *obverse* legend inserted above.

The Reverse device, though identical in character with that of No. 1, offers a modification in the attitude of the figure, which is here exhibited in full front view, and draped with the transparent garments of MAO and others of the Kadphises group (J. A. S. B. IV. XXXVIII. 10.) Though otherwise it is far more *Indian* in its treatment than the copy from Greco-Scythic models to be found on the other coin. The monogram also differs from that in coin 1, and assimilates to those found on Ghatot Kacha pieces, (J. A. S. B. V. XXXIV. fig. 12.) except that it has the second cross-bar as in No. 160, A. A. The *Vikramāditya* has but one क instead of the double letter क्क in No. 1.

These coins are attributed by Major Cunningham to Chandra Gupta the IInd; but on typical grounds alone, they must clearly be assigned to the first prince of that name; and I further draw the

distinction in regard to the titles that the full *Vikramāditya* seems to belong to the third monarch of the family, while the *Sri Vikrama* remains special with the fifth of the race.

CLASS B.—J. A. S. V. XXXVI. 15, A. A. XVIII. 3, Marsden, No. MLVIII.

Obverse. Device. King leaning on his spear, facing him is a female figure.

LEGEND. Indeterminate, under the arm { च
न

Reverse. Parvati, with cornucopia, seated on a lion.

LEGEND. पञ्चवयः "The five excellencies."*

I assign these coins to Chandra Gupta the 1st, but with some hesitation, my chief ground for the attribution being the title on the reverse; there are, however, some minor typical indications that give strength to the attribution, especially the appearance on Mr. Masson's coin of the standard of the full-moon otherwise peculiar to Ghatot Kacha, or even supposing the staff, upon which the King's left hand rests, to be an ordinary spear or javelin, it is to be remembered, that these weapons have definitively been superseded in this position, on the coins of Chandra Gupta the second of the name, by the bow, which he adopts from his predecessor Samudra Gupta. In Marsden's coin the family name of Gupta is inscribed in a line with the Chandra on the opposite side of the standard shaft, a practice which seems to have been discontinued after the introduction of the bow into the coinage devices by Samudra Gupta.

SAMUDRA GUPTA.

CLASS C.—J. A. S. B. IV. Pl. XXXVIII. figs. 16 and 17, Vol. V. Pl. XXXVI. fig. 14, A. A. XVIII. 6 and 9.

Obverse. The usual standing figure of the King; to the left of the field is seen the small altar of the Scythian prototype, associated

* Prinsep adds "to wit of a King. There is a fault in the orthography however * * The words should be written पञ्च वयः. Whether the word *chhavaya* "light" may have any allusion to the five luminaries of the Mithraic worship; the sun, the moon, fire, Jupiter and Venus, it is impossible to say: but that a King should possess five virtues, we learn from various Hindu authorities.

now, for the first time, with the Peacock Standard* (fashioned like

* Professor Wilson supposes this to be "a banner with a bird, probably Garuda, the winged vehicle of Vishnu, but as Skanda Gupta continues to use the emblem, its recognition as an exclusively Vaishnava symbol would create a difficulty in the way of any concurrence with the Rev. H. Mill's theory of the attachment of that prince to the 'opposite system' of worship—Saivism—(J. A. S. B. VI. 7.) but on the other hand, we are struck with the fact of Skanda Gupta's retaining the name of *Bhāgavata* (Vishnu) on his silver coins. I think, however, that Prof. Wilson has, in another place, afforded a clue to the reconciliation of these apparent discrepancies, and that in speculating upon such sectarian divisions, we should more distinctly bear in mind that in the early development of Hinduism, there was but little of antagonism between the tenets of the two creeds; as it has been remarked in reference to the Agni Purana "being of the Vaishnava class: at the same time [that] it leans very favourably to the worship of *Siva*, as the *Linga*, and is full of *Tāntrika* ceremonies in honour of that form of the deity. It was compiled therefore probably anterior to any wide separation between the Saiva and Vaishnavā sects." (J. A. S. B. I. 82.)

As regards the Bird symbol, I think the most obvious and natural interpretation is to look upon it as designed to represent the Peacock, which appears with such frequency on the gold coins and occupies the entire reverse field of one type of the silver coinage.

Major Cunningham—as I have before remarked—claims for Chandra Gupta the second and Kumāra Gupta a Buddhist belief, on the ground of their being designated in the Bhitāri Inscription as "worshippers of the SUPREME BHAGAVAT," which, title he proceeds to argue, must apply either to Vishnu or Buddha, and he concludes, "but as Bhagavat is one of the commonest of the many titles of Buddha, the balance of evidence still remains very much in favour of Chandra Gupta's attachment to Buddhism" (Bhilsa Topes, p. 157). The author however seems to have forgotten that he had previously observed in reference to the deities of each creed, that "the common Brahmanical term, however, is *Bhagavat* and I believe that the use of *Bhagavān* is almost peculiar to the Buddhists," (p. 105, see also J. A. S. B. VI. 872 and VII. 283). It is further to be remarked, apart from many other vital objections—that, if his deduction is to stand, it will be equally necessary to convert Skanda Gupta from Saivism to Buddhism, in virtue of this same term as found on his coins, classes *c. d. e. infra*! Neither am I disposed to attach any more value to his other argument to the same effect, founded on the Sanchi Inscription of Chandra Gupta II. J. A. S. B. VI. 456, inasmuch as even admitting Major Cunningham's improved reading of the opening passage of the Bhilsa Topes, 151, the rest of Jas. Prinsep's translation, which is not objected to, does not very clearly show how much the grant for Buddhist purposes was the direct act of the master or servant! and the assumed amount of £25,000, upon which much stress

a Roman Eagle). The King's left hand rests upon a Javelin.*

LEGENDS 1. Sri ? (a) parajita davaja [Prinsep IV. 635].

2. Vijayajātara Samara satamataga (ja). [Prinsep V. 646]

Under the arm { $\begin{matrix} \text{स} \\ \text{मु} \\ \text{द्र} \end{matrix}$

Reverse. Pārvati seated on a raised throne, with Cornucopia and regal fillet.

LEGEND—परक्रमः—‘The powerful.’

The first of these obverse legends was derived by Prinsep from Coin 16 above cited—the second transcript was obtained from No. 14, aided by other specimens. Professor Wilson [A. A. 424,] distrusts these readings, and apparently with good reason. The following gives the most exact detail of the isolated letters I have been able to compile from the specimens I have examined—

समरशतवत तवजय जतर

it is to be remarked however, that the 1st and 3rd of the three त's, at times show much more of the similitude of the ordinary letter न, but it will be remembered, that this is the correct type of the त in certain Western Alphabets.† Professor Wilson had suggested, (A. A. 424) doubtfully, the reading *Samara sata vataga* for fig. 9, but a coin of Col. Stacy's gives the त quite distinctly, where the Professor would read g.

is laid, dwindles down to a very unprincipled donation under Jas. Prinsep's note of interrogation after the (thousands?) [sic in orig.], the rejection of which reduces the total to £25 !

All the rest of the reasoning to this end depends upon Chandra Gupta's date, which Major Cunningham has certainly not yet succeeded in proving to rule from 400 A. D. to 430 ; but not only is this epochal determination based on the merest assumption, but up to this moment, there is nothing whatever to show, that the Chandra Gupta of the *Sanchi* and *Udayagiri* Inscriptions may not be the Sovereign first of that name in the Gupta family. The coins, we have some data for attributing to the several Chandra Guptas, but these inscriptions give us no aid towards any such identification ; not that I wish to contest the assignment, but it is fit that it should be known to be a clearly open question, and that all deductions based on the subordinate information, must be received with caution.

* The Javelin, the battle-axe and the arrow are enumerated among the weapons Samudra Gupta was in the habit of using as detailed in the Allahabad Inscription. See J. A. S. B. VI. 979.

† Dr. Stevenson, Bombay Journal (July 1853) pl. 17. Kistna, Canara, &c. J. A. S. B. VI. Pl. XIII.

Unpublished Variety of C. Weight 120 gr. *Major Bush.*

Obverse—device as in class C.

LEGEND—5 or 6 letters illegible त व त त व ज य जितरे प र ज त
द व ज one letter or more obliterated. On the sides of the Javelin

च | गु
नु | त
क

Reverse—as usual.

CLASS C. 1.—J. A. S. B. Vol. IV. Pl. XXXIX. fig. 19, A. A. XVIII. 7 and 8.

Obverse. The general outline of the device is the same as in Class C, except that the Peacock Standard is now adorned with Pennons—and a further modification occurs, in the substitution of a bow for the previously adopted javelin, while the arrow in the right hand of the King supersedes the Indo-Scythic Altar, which is henceforth altogether discarded.

LEGENDS are usually defective; Prof. Wilson detects the word *Vijaya* on the margin of No. 8, and there is a most tantalizingly long legend in continuation on coin 7—which it would be hazardous to attempt to read from any mere mechanical engraving.

Reverse—Parvati, as in class C.

LEGEND—अप्रतिरथः “The invincible in his War-Chariot.”

This term is applied to Samudra in the Allahabad *lāt* Inscription—प्रथियामप्रतिरथस्य “whom in his war-chariot none in the world can rival or withstand.” (J. A. S. B. VI. 975).

Professor Wilson renders *Apratiratha* as the ‘unsurpassed warrior,’ “a genuine Sanskrit title.” (A. A. 420, 424).

CLASS C. 2.—J. A. S. B. IV. Pl. XXXIX. 23, Vol. V. XXXVI. II. A. A. XVIII. 10.

Obverse. Figure of the King, in a slightly varied attitude, the right hand rests on the hip-joint, the left is placed on the head of the Battle-axe—to the front of the monarch is a standard surmounted by the device of a new moon below or beyond which, is the figure of a youth.* (The A. A. coin reverses the position of the two figures.)

* “Of him [Samudra Gupta], when the accepted son was pronounced to be the son of Dévi, daughter of Mahadaitya.” Bhitāri *Lāt*, J. A. S. B. VI. 6.

LEGEND. Kubháva paraguja, (Prinsep V. 645.)

Under the arm- - { $\begin{matrix} \text{ॐ} \\ \text{ॐ} \\ \text{ॐ} \end{matrix}$

Reverse. The ordinary Parvati figure—but her feet rest on either “seeming flame” according to the A. A. Coin; or “the leaves of the lotus,” in the Prinsep specimens.

LEGEND, ॐ तन्त परसु The battle-axe of Pluto.

Prof. Wilson in speaking of Prinsep’s decipherment of these legends, remarks “his attempts to give a meaning to these syllables are very unsuccessful,” he himself suggests *Kratu-paraga* (A. A. p. 324, 325).

This legend, therefore, has hitherto presented an acknowledged difficulty; however, the individual letters appear in their well-formed outlines to be readily susceptible of definite identification. The legend obtained from several specimens and determined by Major Bush’s coin, is $\text{ॐ तन्त परसु राजाधिराज}$. “Sovereign of Kings whose battle-axe is like Pluto’s.”

A second coin in the Prinsep Cabinet, now in the British Museum, confirms this reading—with the important modification, that the second perpendicular line of the final consonant ॐ , in *Parasu*, is prolonged downwards and forms thus the alternative subjunctive vowel ॐ , which letter the continuous curved up-stroke of the same limb of the ॐ in coin 23, equally serves to represent. In this new coin the letter ॐ intervenes between the ॐ and the succeeding ॐ , forming the word *Rāja*, possibly used as the opening of *Rājadhira-ja*. In regard to the ॐ which I read in preference to Prinsep’s ॐ ,* a moment’s examination of coin 11. Pl. XXXVI. Vol. V. will satisfy the reader that if the second letter in the reverse legend is an admitted ॐ , the final consonant of the same word should accord with it in form, if the latter is to be received as an identical letter—it will be seen that it does not do so—but, as more distinct evidence of my assertion may be needed, I am in a position to add that the unpublished coin above alluded to, gives in the reverse final the ॐ in all the distinct identity of the cross-stroke within

the double lines of the old g, which constitutes *the* essential distinction between the two letters.

CLASS D.—J. A. S. B. IV. Pl. XXXIX. fig. 26.

Obverse. The King is seated on a species of couch, or chair, the back of which is placed on the right hand side of the figure, in which arrangement it assimilates with certain forms of the throne of Párvatí. The Monarch is engaged in playing on the *Vina*, or Indian Lyre.*

LEGEND. महाराजधिराज ओ स [मु] द्र गुप्तः

Reverse. Párvatí, with cornucopia and regal fillet, seated on an Indian *Morha*.

LEGEND. समुद्र गुप्तः

Class E.—J. A. S. B. IV. XXXIX. 31. 32. A. A. XVIII. 2. Freeling, W. 115 gr.

Obverse. A richly bedecked horse standing before an Altar.

LEGEND न व ज म धः राजधिराज पृथिवी विजयत ए; below the horse से.

Reverse. Female holding a *Chauri*, the figure is draped in the light garments of the Chandra Gupta 1st style (class A).

Legend अश्वमेध पराक्रमः The Hero of the Aswamedha.†

I have but little hesitation in attributing this coin definitively to Samudra Gupta.

The *Parakrama* title on the *reverse* would in itself go far to justify such an assignment, but the *obverse* title of *Prithivi Vijayatyā* distinctly associates the identity of the monarch with Samudra, who has applied to him a similar style of eulogy in the Allahabad Pillar Inscription, where we read, ओ समुद्र गुप्तस्य सर्वपृथिवी विजयति तो दय &c.‡

* Samudra's "accomplishments in singing and playing" are eulogised in the 24th verse of the Allahabad Inscription. J. A. S. B. VI. 980.

† Wilson observes in regard to this type of coin, "That the steed represents one dedicated to the Aswamedha, or solemn sacrifice of a horse performed only by paramount sovereigns cannot be doubted, from the inscription Aswamedha-parakrama, he who has the power of the Aswamedha rites (A. A. 421.)" See also Tod, I. 63, 76, 583, &c.

‡ J. A. S. B. VI. 978.

A second specimen of this type of coin in the collection of Major Bush appears to vary the obverse legend—but the letters are too much worn to be satisfactorily deciphered.

CHANDRA GUPTA IInd.

Class C. 1.—J. A. S. B. IV. XXXIX. 18. Vol. V. XXXVI. 13. XXXVIII. 9. A. A. XVIII. 4. Marsden No. ML.

Obverse. Figure as above C. 2.

LEGENDS, imperfect. The following is a restored reading obtained from Col. Stacy's coins.

देव श्रीमहाराजाधिराज श्री चन्द्रगुप्त. His Majesty.

Under the arm { च } “The auspicious sovereign of great
 { न्द्र } Kings, Chandra Gupta.”

Reverse. Parvati seated on an elevated throne with cornucopia and regal fillet (in No. 18). The cornucopia is replaced by a flower in the later specimens.

LEGEND. श्रीविक्रमः “The illustrious hero.” (A. A. 420.)

Variant No. 1, No. MLVII. Marsden.

The obverse device presents a modification in the arrangement of the Bow, which is turned inwards and touches the side of the figure—while the चन्द्र is inscribed in the field outside of the bow-string. Legend, to the left, श्रीचन्द्रगुप्त.

Among a batch of twenty gold coins found at Gopálpur on the “Gogra river, on the site of the old Village Fort, ten miles west of Burhul,” in July 1854,* I observe a coin which corresponds very closely with this variant, and confirms in the most definite manner the reading of the right marginal legend already assigned to the original type C. 2—every letter is here indubitably to the following effect.

देव श्रीमहाराजाधिराज

Class F.—J. A. S. B. V. XXXVIII. 6.

Obverse. King on horseback proceeding to the right, with lance at the charge.

* Seven of those coins were submitted to the Government N. W. P. in May last, by Mr. W. Roberts, the officiating Judge of Goruckpore—all these are from the mints of Chandra Gupta 2nd.

LEGEND. परम भ* श्रीचन्द्रगुप्तः

Reverse. Parvati seated on an Indian *Morha*, with fillet and flower.

LEGEND. अजित विक्रम

KUMARA GUPTA.

Class C. 1.—Freeling (unpublished.)†

Obverse. Device as is usual in this type.

LEGEND on the margin * महाराजधिराज **

Below the arm {
क
म
र

Reverse. Parvati seated cross-legged on a lotus, the right hand holds a fillet, or at times, a flower—the left rests either upon the knee or on the side of the figure.

LEGEND श्रीमहेन्द्र Sri Mahendra.

Variety No. 1. J. A. S. B. V. XXXVI. 16. A. A. XVIII. 11. the name of the King is given, in this coin, as above, but it is placed in a line with the bow-string *outside* the arm of the figure as in variant No. 1, C. 2, of Chandra Gupta IInd.

Variety No. 2. J. A. S. B. V. XXXVI. 20. A. A. XVIII. 12.

Obverse. Device as usual.

LEGEND * जयति महेन्द्र * * under the arm कु.

Variety No. 3. An unpublished coin in the Prinsep Collection B. M.

Obverse. General device as in No. 2.

LEGEND on the margin: this I am unable, at this moment, to transcribe, but it concludes with the name of Kumára.

Reverse. Device as above.

LEGEND. श्रीकुमार गुप्त.

Variety No. 4. Freeling. W. 125 gr.

Obverse. Device as in No. 2.

LEGEND * * * व—विजितावनिरवनिपति. See silver coins *infra*, class 1 2 3 &c.

* परम भगवतो is one of the Prefixes to Chandra Gupta's name in the Bhitári Lát Inscription, J. A. S. B. VI. 4.

† This coin, though a cast, appears to have been taken from genuine original.

Variety No. 4. Col. Stacy. Wt. 126 gr.

Obverse. Device as usual. The name of कुमारगुप्त occupies the left margin. There is no name or initial under the arm.

Class G. Type. J. A. S. B. V. XXXVIII. 1.

(Unpublished coin of Col. Stacy's Cabinet.)*

Obverse. King facing to the right, armed with a bow, shooting a lion.

LEGEND. सिंहविक्रमकुमार [गुप्तपरिधि] सिंह महेन्द्र

Kumara Gupta, of might like a lion's most prosperous [Mr. Hall.]

Reverse. Parvati seated on a lion, her right hand extends the fillet, the left, which rests upon her knee, holds a flower.

LEGEND. सिंहमहेन्द्र —Sinhá Mahendra.

Variety No. 1. J. A. S. V. XXXVIII. 8.

Obverse. LEGEND * न महेन्द्र जय * * श्री * *

Reverse. LEGEND महेन्द्र सिंह

Class H. 1. J. A. S. B. IV. Pl. XXXIX. fig. 25.

Obverse. The King facing to the left, armed with bow and arrow, attacking a lion.

LEGEND. महाराजाधिराज श्री * * *

Reverse. Parvati with fillet and flower—seated on a lion.

LEGEND श्रीसंहविक्रमः Śrī Sinha Vikramah.

Class G. 2. J. A. S. B. V. XXXVIII. 1, 2.

Obverse, as above, class G.

LEGEND—?

Reverse, as above, class G.

LEGEND. सिंहविक्रमः

Class I. J. A. S. B. IV. XXXIX. 28.

Obverse. Erect figure of the King, who has just discharged his arrow at a lion.

LEGEND "Sri bal parakrama" [Prinsep IV. 637.]

Reverse. Standing female, with flower in the left hand, the right is extended to a Peacock.


LEGEND. कुमारगुप्त * * * Kumára Gupta * *

* This coin—in weight 126 grains—is also a cast from a genuine original.

SKANDA GUPTA.

Class C. 1.—J. A. S. B. IV. XXXIX. 22. Vol. V. XXXVI. 17, 18. XXXVIII. 10? Marsden MLV.

Obverse, as in class, C. 2.

LEGENDS imperfect—under the arm { 

Reverse. Parvati seated cross-legged on lotus flowers.

LEGENDS on 22 and 17, क्रमादित्यः Kramādityah.

Ditto on 10 and 18, श्रीस्कन्दगुप्तः Śrī Skanda Gupta.

Class J. J. A. S. B. IV. XXXIX. 24.

Obverse. King to the left of the field, holding a bow—the Peacock standard occupies the centre and a female figure fills up the space on the right.

LEGEND, illegible.

Reverse. Parvati on lotus, with flower and fillet.

LEGEND. श्रीस्कन्दगुप्त—Śrī Skanda Gupta.

MAHENDRA GUPTA.

Class F. 2. J. A. S. B. IV. Pl. XXXIX. 30, Marsden MLIX.

Obverse.—Horsemen as in class F, but without the lance.

LEGEND * * महेंद्र गुप्त.

Reverse.—Female seated on a morha, feeding a peacock.

LEGEND.—अजित महेंद्र—Ajita Mahendra.

Variants. J. A. S. B. XXXVIII. figs. 3, 4, 5, A. A. XVIII. 16, 70.

Class F. 3. Unpublished. Freeling.

Obverse.—Device as is usual in this class, with the exception that the horseman is proceeding to the left instead of to the right.

LEGENDS undeciphered.

Reverse.—Parvati with peacock.

LEGEND—अजित महेंद्र.

There is a gold coin in the Prinsep collection B. M. very similar to the type of class C. which has the following letters thus arranged under the left arm पु म् The Reverse displays the usual

figure of Parvati with the remains of a *Greek* legend.

I next proceed with the various series of *silver* money of the Gupta princes.

SRI GUPTA?

CLASS *a*; Silver, weight 31 grains. Freeling, unique and unpublished.

Obverse.—Device, the original type of the Sáh head, apparently unchanged in outline or details.

LEGEND, as usual, in imperfect Greek characters, the concluding six letters of which alone are visible, thus—ACIOIO.

Reverse.—Device, a singular figure that may possibly represent the early design of the Gupta peacock as rendered by the local artists, beneath which is a linear scroll of three semi-circles similar to that seen in continued use on certain silver coins of Skanda Gupta,* above the main device are retained the Sáh cluster of stars and a minute half moon seemingly borrowed from the same source.

LEGEND—श्री — न्दगुप्तवक्त्रमद्रस्य श्रीगुप्तद्वल्लभद्र. — — —

Prof. Hall proposes to amend the legend, thus—

श्रीनन्दगुप्त विक्रमेन्द्रस्य श्रीगुप्त कीर्णालेन्द्र — — —

To this he assigns the following translation: "The auspicious, KÍRALENDRA, son of the auspicious NANDA GUPTA, (who was) an Indra in prowess." Thus reading the SRI GUPTA as the mere title; I should prefer to consider it as the regal designation, accepting KÍRALENDRA as the personal name, the use of which may well have been discontinued in the subsequent family inscriptions. The name of Sri Gupta's father is of but little import, we may, therefore, for the present let it stand as Nánda.

There is probably no coin in the entire Gupta series, of which we are at present cognizant, that possesses so much historical importance as this diminutive piece.

The absolute identity of the execution of the obverse device with that of the fixed Sáh model necessitates a concession of an almost immediate succession of some portion of the Gupta family to the

* J. A. S. B. IV. Pl. XLIX. figs. 4, 5, VII. Pl. XII. fig. 19; J. R. A. S. XII. Pl. II. figs. 43, 44; A. A. XV. 20. Prof. Wilson in speaking of the reverse device of this particular coin describes it as "an ornament like a disintegrated Chaitya."

dominions of the Sáh kings of Suráshtra. I had formerly, while reasoning upon the numismatic materials then at command, been led to conclude that a considerable interval might have elapsed between the fabrication of the Sáh exemplars and the deteriorated Gupta imitation of that style of coinage, but I am now fully prepared to amend this inference, and to approximate the later Sáh monarchs very closely to some of the early members of the Gupta race; to carry this out satisfactorily I am aware that I must either modernise the Sáh's from my first assignment of date or elevate ten Guptas to a higher degree of antiquity than I have previously claimed for them.*

It is not my intention, neither have I time at command while this paper is*being put to press, to enter into the general re-consideration of the true Sáh epoch, it is sufficient for the present to indicate freely the new bearing assumed of the entire question under the evidence, contributed by the type of this unique coin.

KUMÁRA GUPTA. *

CLASS *b*; J. A. S. B. VII. Pl. XII. 16, 17; J. R. A. S. XII. Pl. II. 39, 40, 41, 42; A. A. XV. 17, 18.

Obverse.—Head of the king in profile: the outline and design are nearly identical with the Suráshtran prototype, the mintage of the Sáh kings—at the back of the head is ordinarily to be seen a mutilated portion of the Scythian title PAO NANO. This important legend affords another link in the direct association of the Guptas with the Indo-Scythians, which is here the more marked, in that, while the device itself is servilely copied from the Sáh's, their obverse Greek legends are superseded by this new title.

Reverse.—It is difficult to determine satisfactorily what the emblem occupying the *Reverse* field may be intended to typify, but the most plausible supposition seems to be that it displays an advance upon the conventional representation of the peacock under

* I have had so much to object to in Major Cunningham's arguments and inferences, that I may here complimentarily mention that, he has already contended for a direct and immediate succession of the Sáh's by the Guptas, *Bhil. Treas.*, p. 148.

Western treatment, following out the artistic notion of that bird given in Sri Gupta's coin.

LEGEND.—परम भगवत राजाधिराज श्रीकुमार गुप्त महेंद्रस्य.

Parama Bhagavata Rājādhirāja Śrī Kumāra Gupta Mahendrasya.

The second word of this legend is the only portion of the whole that is at all open to question; it has been read *Bhānuvira* by Prinsep,* but this is not by any means a satisfactory interpretation. The 1st and 3rd letters are fixed and constant in the various examples, and are properly rendered in each case as भ and व; the second and fourth letters vary considerably in outline on the different specimens; the second letter I have never yet met with in its perfect shape as ग when tried by the test of the ग in Gupta, indeed the majority of the coins display it more after the form of a न, as that consonant is found later in the legend in Mahendrasya. The same remark also applies to the final न. I see that Prof. Mill has conjecturally supplied the word *Bhagavata* in the prefix to Kumāra Gupta's titles on the Bhitari lāt (VI. 4) but Prinsep's Facsimile of the inscription though it accords the needful space for the exact number of letters, gives the final as a manifest न; in saying this, however, I must remind my readers that in the alphabet in question, the slightest possible inflection and continuation of a line constitutes the essential difference between the two letters न and त, and on the other hand the local copper plates of the Valabhis render the ग very much after the shape of the Eastern त, while the indigenous त is but little different from the न of the coins under reference. And finally as the words *Parama Bhagavata* appear in all their indubitable majority on the succeeding coins of Skanda Gupta, we may fairly assume a mere imperfection in the expression of the individual letters and leave the word as it has been entered in the legend above.

The coins under notice are not always complete in the Sanskrit legends; for instance, an otherwise very perfect piece in the cabinet

* J. A. S. B. VII. 356. Prof. Wilson A. A. 412, has suggested *Bhattaraka* (?) which the Udayagiri inscription (Bhilsa Topes, 151) rather recommends to our notice.

of the Royal Asiatic Society has the word राजाधिराज abbreviated into राजाध; and No. 39 has the same word contracted to राजाधिर.

Since my last notice of these coins in the J. R. A. S. in April, 1848, I have had an opportunity of examining a set of very perfect coins, thirteen in number, which were found at Ellichpore in 1851, and presented to the late Sir H. M. Elliot. These do not however, add any thing to our previous knowledge of the subject. Their average weight was 29 grains, the highest being 32 grains.

SKANDA GUPTA.

CLASS *c*; *J. A. S. B.* VII. Pl. XII. 18, 19; *J. R. A. S.* XII. Pl. II. 43, 44; *A. A.* XV. 20.

Obverse, as in class *b*. Kumára Gupta, but the execution has greatly deteriorated; on some specimens traces of the word NANO are still to be seen.

Reverse.—The device in this class of money, appears to offer a more direct imitation of that of the Sri Gupta pieces, than did the intermediate Kumára reverse types, these latter are seen to reject the foot scrolls and to vary the details of the centre figure to a considerable extent.

LEGEND—पमर भगवत श्री स्कन्द गुप्त क्रमादित्य

Parama Bhagavata Sri Skanda Gupta Kramaditya.

PRINSEP, in his collated reading of the legends on these coins (*J. A. S. B.*, vii. 356), adopted the letter न (for मन्हा) as occurring after the word भगवत [or भगदत्त as he made it], which he found to be followed by the title of राज, which precedes the name of the monarch. This rendering, he would seem to have drawn from fig. 29, Pl. II., STEUART (*J. R. A. S.*, 1837); but as the like letters do not generally recur, I have marked this as the exception rather than the rule.

The weights of these coins vary from 23 to 29 grains.

CLASS *d*; *J. R. A. S.* XII. Pl. II. 45, 46; *A. A.* XV. 19.

Obverse.—Crudely outlined head, with traces of the title NANO in front of the profile.

Reverse.—Figure of Nandī identical in form and position with the *seal* symbol of the Valabhi family as found on their copper-plate grants. (J. A. S. B. IV. Pl. XL. and p. 487).

LEGEND—[restored].

परम भगवत श्री स्कन्द गुप्त क्रमादित्य

Parama Bhagavata Sri Skanda Gupta Kramāditya.

These legends are frequently very incomplete, varying in the number of letters in each ; but, as I have already sufficiently adverted to this subject,* I need not repeat my observations in this place.

The standard of these coins is very uncertain, rising from a weight of 21 to 30 grains.

CLASSES *e. f. g.* [The references are prefixed to each variety].

Obverse.—The usual head, generally ill defined, but still identical in many respects with the original device on the obverse of the Sáh medals ; it is occasionally also accompanied by distinct traces of the word NANO.

Reverse.—Central symbol in the form of an altar, which is supposed to represent the common altar-shaped receptacle of the sacred Túlśi tree of the Hindus. Legends restored—

CLASS *e.* ; J. R. A. S. XII. Pl. II. 49.

परम भगवत श्री स्कन्द गुप्त क्रमादित्य

Parama Bhagavata Sri Skanda Gupta Kramāditya.

CLASS *f.* ; J. R. A. S. XII. Pl. II. 50.

परम भगवत श्री स्कन्द गुप्त परमादित्य

Parama Bhagavata Sri Skanda Gupta Paramāditya.

CLASS *g.* ; J. R. A. S. XII. Pl. II. 51.

परम भगवत श्री विक्रमादित्य स्कन्द गुप्त

Parama Bhagavata Sri Vikramāditya Skanda Gupta.

"There are between seventy and eighty specimens of these various Túlśi device Skanda Gupta coins in the Prinsep collection, B. M. They are commonly but carelessly fashioned, and unevenly struck. The letters of the legends, however, are in high relief, and unusually well preserved, though there is at the same time a decided absence of uniformity in the expression of many characters of analogous value, and their general outline is remarkable for a degree of rude-

* J. R. A. S. XII. p. 66 ; J. A. S. B. ? ?

ness, similar to that already noticed by Prinsep* as existing in the coeval alphabet of the 3rd or Skanda Gupta Inscription on the Girnar Rock.

The irregularity in the completion of the legend noted as occurring on Skanda Gupta's coins with the Bull reverse, appears in a still greater degree in those of the present class.

The weight of this class of coins is more than ordinarily unequal, rising from 22½ to 33 grains!

Though not properly susceptible of classification with any Gupta series of coins, it is needful to notice in connexion therewith a species of money which seems to constitute an independent derivative from the same Saurastrian type that served as a model for the local currency of the Guptas in certain Western provinces of their empire.

I allude to the pieces figured as Nos. 6 to 8 and 9, Plate XLIX. Vol. IV. J. A. S. B.† Prinsep at the moment of their publication‡ scarcely attempted any decipherment of the certainly very unpromising legends, and was equally at fault in regard to the reverse device which he described as "a symbol in the form of a trident:"§ when subsequently he came to take up the general subject of the Sáh and Gupta silver coinage in full detail,|| he still essayed no advance upon the attribution of this offshoot of their common prototype. In my paper on the Sáh kings¶ I made some slight progress towards determination of the purport of the legends, and apart from the typical coincidences, was able to demonstrate more precisely the Sáh association in the decipherment of the words राज्ञो महा क्षत्रियस on the margin of the best preserved specimen of the series.

* J. A. S. B. VII. 348.

† Other examples of this currency will be found delineated in J. R. A. S. IV. Pl. II. fig. 30, XII. Pl. II. figs. 35 to 38.

‡ December, 1835.

§ Prinsep writes "figs. 6 to 9 are one step further removed from perfection. The legend where best preserved, as in fig. 9, appears a mere repetition of the letter *p*, with the suffix *r*, *ri*, and *y*, * * * the central symbol has the form of a trident. Lieut. Burnes informs me that several hundreds of these three species of coins were found in Cutch in 1830, in a copper vessel buried in the ruins of *Puragarh*, twenty miles west of Bhoj, a place of great antiquity, and yet marked by the ruins of a palace and a mint." IV. 687.

|| J. A. S. B. VII. April, 1838.

¶ J. R. A. S. XII. 15th April, 1848.

A coin of Mr. Freeling's that I have now before me, of apparently early date presenting a well defined and nearly complete legend, promises materially to advance the enquiry and to furnish a key to the strangely distorted letters stamped on the later emanations from the parent mint. I proceed to describe the piece in the ordinary form.

Silver, weight 27 grains.

Obverse.—The usual Sáh head, apparently but little modified. This surface of the coin is damaged, but fully one-half the marginal space, around the profile, remains uninjured and in the total absence of any sign of a letter confirms my previous supposition,* that the use of the Greek legend was not extended to this class of coin.

Reverse.—Device, a barbarized imitation of the Minerva Promachos of the Bactrian Coinage.

I was once disposed to look upon the singular figure on the reverse of those coins as the Buddhist device of a man; I was led to this conclusion by the similarity of the form of the figure sketched by Jas. Prinsep, in fig. 21, Pl. XVIII. Vol. III. J. A. S. B. to that occurring on the Behat type of coins;† but I now observe that Prinsep, in his second engraving of the same coin IV. Pl. XLIX. 9, omits the left arm, in its downward position, which constituted the most essential point of Behat identity.

LEGEND. य ह भु न इ र क स र ञ म ह क्ष त्र प र म द व क ण भ स द म न

Variants ? श्रीः स ह

ह क

Prof. Hall, confesses himself fairly baffled by this legend: I therefore allow it to stand as originally transcribed from the coin, trusting that new specimens may hereafter aid in the due interpretation. The configuration of certain letters in these legends however demands a passing notice. The character which Prinsep took for *Pr. &c.*, is now satisfactorily proved to be a म; the form is peculiar, but still it bears sufficient affinity to the general idea of the Gupta म. In the later specimens of the coinage, its upper section

* "One item seems safely deducible from the unoccupied margin, to be found around the bust in the broader coins, viz., that the use of Greek or its attempted representation was here discontinued." J. R. A. S. XII. 63.

† J. A. S. B. IV, Pl. XXXIV. 16, Pl. XXXV. figs. 45-47, &c.

is distinguished from the ordinary ॠ by the rounding off of the lower portion of the first down-stroke, while the ॠ itself is squared at the base. The nearest approach to identity with this Numismatic ॠ is to be found in the outline of that character as expressed on the Udayagiri Inscription, but it must be remarked that this similitude affords but little aid towards determining geographical limitation, as the majority of the letters of the inscription itself are exceptional, and do not accord with the characters of the other writings of the same locality. The ॠ of these coins takes the same shape as those on Kumára's silver coins, Class *b*, above adverted to. The remaining letters, as far as they have been definitively identified, seem to follow the ordinary *Sáh* style.

My readers may consider these details tedious: they are necessarily so, but to justify myself for inflicting them, I may mention that while I am disposed to demur to Prinsep's conclusion, that the date of all Indian writings may be invariably determined by the mere forms of their letters, I am on the other hand inclined to believe, that under a comprehensive and well considered system of comparison of alphabetical characters, traced down from their common origin through existing monuments,* to the fixed modern forms, we may determine with some precision the section of the country, if not the kingdom,† to which any given inscription may owe its origin.

* The Bhilsa monumental writings in their variety might be supposed to militate against any such possible system of identification. but as has been before remarked, this sacred site seems to have been held in equal honor by eastern and western races, who possibly employed the indigenous artists to copy the originals peculiar to their several countries; if they did not even employ engravers from their own land.

† In seeking to discover the locality whence these coins emanated, it may be useful to note the information contributed by Hweun Tshang on the subject of the divisions of the western kingdoms: it is to be remembered, that though the supremacy may have varied, the classification of states probably followed the ancient boundaries.

Leaving Mabáráchtra, Hweun Tshang is described as "se dirigeant au nord-est, il fit environ mille li, passa la riviere *Naï-mo-l'o* (la Narmadá) et arriva au royaume de *Po-lou kie tchen-p'o* (Baroukatch' éva—Baroche.) De là, marchant encore au nord-ouest, il fit deux mille li et arriva au royaume de *Mo-la-p'o* (Malava) * *

I now approach the original object of the present paper, viz. the peacock reverse coins which form the appropriate conclusion of the Gupta series, in the double aspect of commencing with the designation of the Vith Monarch of the succession, and in presenting us with the sole medallion record of the latest king named in the inscriptions.

BUDHA GUPTA.

CLASSES 1, 2 and 3.

Obverse.—The usual head in profile, manifestly imitated from the normal Saurashtran device; the close fitting cap or helmet of the proto-type is however at times degraded into a mere skull-cap, the long hair is arranged after the manner of the Sâh model and the collar of the dress is likewise retained in its original identity. The general inferiority of the die-execution is most marked, and the Indian leaning of the artist is exemplified in the expression given to the eye, which instead of its once classic form is here exhibited in the almond-shaped, full-front optic placed well over the side of the cheek: in the marginal space outside the profile, are to be seen three letters or figures, which may be appropriately reserved for future

Suivant la tradition, le trône était occupé, il y a soixante ans, par un roi nommé *kiaï-ji* (çilâditya), * * pendant les cinquante ans qu'il resta sur le trône. * * De là il fit de deux mille quatre cents à deux mille cinq cents li au nord-ouest, et arriva au royaume de *O-tch'a-li* (Atali ?) * * De là il fit encore trois cents li au nord-ouest, et arriva au royaume de *Kitch'a* (Kiṭṭa). [Ce pays est soumis au royaume de Ma-la-p'o. Si-yu-ki XI. 16.] De là il fit mille li au nord et arriva au royaume de *Fa-la-pi* (Valla bhi.)

"Le roi actuel est de la race des *Tsa-ti-li* (Kchatriyas); il est le gendre de *Chi-lo-o-tie-to* (Çilâditya) roi de *Kie-jo-kio-che* (Kanyâ koubdja); son nom est *Tou-lou-p'o-po-t'o* (Dhrouvapaṭou). * * De là il fit sept cents li au nord-ouest et arriva au royaume de *O-nan-t'o-pou-lo* (Anandapoura). De là il fit cinq cents li au nord-ouest et arriva au royaume de *Sou-la-tch'a* (Sourâchtra) [Il est soumis au royaume de Falâpi Si-yu-ki X. 18]. De là il fit dix-huit cent li au nord-est et arriva au royaume de *Kiu-tche-lo* (Gourdjara). [Ce roi est de la race des Kchatriyas *Si-yu-ki*, XI, 18]. Ensuite, il fit deux mille huit cents li au sud-est et arriva au royaume de *Ou-el-yen-na* (Oudjayana). [Le roi est de la race des Brâhmanes; *Si-yu-ki*, XI. 18].

De là il fit neuf cents li au nord-est et arriva au royaume de *Mo-hi-chi-fa-lo-pou lo* (Mahêçvarapoura). [Le roi descend d'une famille de brâhmanes]. De là, tournant à l'ouest, il revint au royaume de *Sou-la-tch'a*."

examination in conjunction with the Indian Numerical series at large to which their various examples contribute an independent section.

Reverse.—Device, a full front view of a peacock with expanded tail.

LEGENDS.

CLASS 1. *Kumāra Gupta*, J. A. S. B. IV. Pl. XLIX. figs. 10, 11 and 12.

देवं जयति विजितावनिरवनिपति कुमार गुप्त

Dev(o) jayati vijitāvanir avanipati(h) Kumāra Gupto "His Majesty KUMĀRA GUPTA, who has subdued the earth, rules."

CLASS 2. *Skanda Gupta*, J. R. A. S. XII. Pl. II. figs. 52, 53.*

विजितावनिरवनिपति जयति देव स्कन्द गुप्त य

Vijitāvanir avanipati(r) jayati deva(h) Skanda Gupta-y.

CLASS 3. *Budha Gupta*, J. R. A. S. XII. Pl. II. figs. 55, 57.

देव जयति विजितावनिरवनिपति श्री बुध गुप्त

Dev(o) jayati vijitāvanir avanipati(h) Śrī Budha Gupto.

* When once fairly deciphered, these legends will be seen to present but few difficulties. The lapidary inscriptions have already proved that the Gupta artists indulged in faulty Sanskrit orthography as well as in grammatical errors, so I need not detain my readers by any comments upon minor imperfections, while the general sense of the legend is sufficiently clear. I must mention that in my devanāgarī transcripts, I have adhered servilely to original legends impressed upon the coins; the version in the Roman type is corrected up to Sanskrit requirements.

There is a superfluous य (or possibly a न after the गुप्त on Skanda Gupta's coins, the use of which is not apparent, but which clearly takes the place of the final O in Kumāra's legends.

I may note that Kumāra Gupta's coins display both the old form of न and the more specially Gupta outline of that character.† The य is also seen in its transition state from the triple lined letter of

* I should mention that my references to the published engravings of the coins of Skanda Gupta and Budha Gupta are based on my own facsimiles copied from the coins themselves.

† J. A. S. B. IV. Pl. XLIX. figs. 10 and 12.

early days to the almost modern form, while at times it appears on Skanda's money as a character not easily distinguishable from the later Kumára M, just adverted to. This extensive modification of the ॐ in the numismatic alphabet is the more curious, as the corresponding lapidary character retains all the essentials of its ancient outline, throughout the Gupta inscriptions, from the Allahabad pillar to Budha Gupta's record at Erun and even on to Toramāna's inscription at the same place.

The weights of these coins run as follows:—

9 fair specimens of Kumára's mintages average 30.1 grains, highest weight 33 grains.

8 fair specimens of Skanda's coinage average 31.7 grains, highest weight 35 grains.

Dr. Swiney's coin of Buddha, No. 55, Pl. II. J. R. A. S. XII. weighs 32 grains.

Their relative rarity may be approximately inferred by the numbers of the coins of each prince in the Stacy, my own, and Mr. Freeling's collections.

	Stacy.	Thomas.	Freeling.
Kumára's	6	6	7
Skanda's	4	4	1
Buddha's	0	0	0
Doubtful,	2	1	1
<hr/>			
Total,....	12	11	9

These coins of the peacock type would seem to have formed the recognised silver currency of the central and Eastern provinces of the Gupta dominions, for though they are found in limited numbers amid the hoards of the local coinage of the Western states. The relative proportions seem to be reversed in the *finds* of the Eastern districts of the Gupta empire. Three in my own collection have chiefly been obtained from Kanouj itself, while Mr. Freeling's centre of operations is Humeerpore on the Jumna.*

* Prinsep remarks on this head, "Figs. 10, 11, 12, are of a different type, though nearly allied to the former; they are not only found in Gujrát, but at Kanouj, Ujjain, and generally in Upper India. Lt. Cunningham has just sent me impressions of five very well-preserved specimens procured at Benares," IV. 687.

It may be useful to summarize in this place the proved dates, discovered on the various specimens of the peacock coins that I have had an opportunity of inspecting—leaving the consideration of the grounds whereon these determinations are based for future scrutiny.

Kumāra's coins bear ciphers for *one hundred and twenty and one* = 121; others display figures for 124—one piece discloses a unit for *five* and another a sign which I doubtfully class as a *nine*, but in both these instances the decimal cipher is obliterated.

Skanda Gupta's money continues the series in the use of the same figure for *one hundred*, with the addition of two new symbols in the decimal place.

Buddha Gupta in like manner dates in the first century of the given era, but the value of his second cipher is undetermined.

The inscription at Sanchi, it is to be remembered, bears date 165.

COPPER COINS.

I notice the copper coins of the Guptas merely to complete the series, as they add nothing of value to the historical enquiry.

Prinsep remarks that they are "much more scarce than the gold coins of the same age, and hitherto only those of one individual of the family have been met with." Varieties of these pieces are engraved in figs. 11, 12 and 15, Pl. XXXVIII. Vol. V. J. A. S. B. These bear the name and titles of Chandra Gupta on the reverse, which may be restored in full as महाराज श्री चन्द्रगुप्त. Nos. 13 and 14, of the same plate in addition to the name have श्री विक्रमादित्य on the obverse, inscribed below the bust of a female offering a flower.*

TORĀMAṆA

CLASS 4. S. wt. 32 grains, unique and unpublished.

Obverse. The usual Sāh type of profile but with the artistic merits still further diminished. The head is turned the reverse way and looks to the left.

In front of the profile are seen the figures for eighty with the uncertain symbol entered last in the line of Gupta units.

* See also A. A. 427.

Reverse.—Device. Peacock greatly debased and facing more to the left.

LEGEND. वी नीवयक्वर्द श्री तोरमान

It will be remembered that this king TORÁMANA* is adverted to in the following terms in the inscription on the Varáha image at Eran in Bhopál. “When the great rája TORÁMANA, the very famous and beautiful, the king of kings, governed the earth; in the first year of his reign, on the 10th day of *Phálguna*.”

Jas. Prinsep, in noticing this monument, in connexion with the Budha Gupta record on the associate pillar, prefaces his translations with a summary of the relative dates of each inscription as illustrated by their respective contexts.† He observes, “The temple was built by Dhanya Vishnu the confidential minister of Rája Mátri Vishnu, the son of Hari Vishnu, grandson of Varuna Vishnu and great grandson of Indra Vishnu; in the first year of the reign of Torámána of *Suráshtra* (?) : and (sic)

“The pillar was erected by Var’dala Vishnu, the son of Hasti Vishnu, also grandson of Varuna Vishnu, and at the cost of Dhanya Vishnu on the 14th of Asarh in the year 165, in the reign of Bu-

* Prinsep writes the name Tárápáni : I follow Major Cunningham’s emendation, which indeed is necessitated by the legend of the coin (*Bhilsa Topes*, 164).

† I also transcribe Major Cunningham’s observations on this subject :

“We learn from the inscriptions on the colossal *Varáha Avatar*, at Eran, that the paramount sovereign *Toramána* possessed all the country about Bhupál and southern Bundelkhand not many years after the elevation of Budha Gupta’s pillar; for the pillar was erected by Vaidala Vishnu, at the expense of his cousin Dhanya Vishnu, while the colossal Boar was set up by Dhanya Vishnu himself. The death of Budha Gupta, and the accession of Toramána, therefore both took place during the life-time of Dhanya Vishnu. But there must have been an interval of some years between the two events, as Dhanya’s elder brother, Mátri Vishnu, who is not even mentioned in the pillar inscription, had since assumed the title of Mahárája, and was then dead. Dhanya himself then became regent, apparently to the young prince, Toramána; for, in another inscription from the Fort of Gwalior, I find Toramána described as the son of Mátri Dása and the grandson of Mátri kula, who is probably the same as Mátri Vishnu [?] As the celebrated hill of Udayagiri is mentioned in the Gwalior inscription, there can be little doubt of the identity of the two Toramánas, and of the consequent extension of the principality of Eran to the banks of the Jumna.” *Bhilsa Topes*, p. 164.

Budha Gupta in *Surāshtra*, comprehending the country between * * the *Kalindi** or Jumna and the *Narmada*, or *Nerbudda*.”†

Prinsep was clearly disposed to infer that the temple was built prior to the erection of the pillar, and in this supposition I myself was formerly inclined to concur;‡ but the degradation of the type

* I had previously expressed distrust in the accuracy of the transcription of this name by JAS. PRINSEP (J. R. A. S. XII. 71,) I did so on the very justifiable ground that his own accompanying facsimile did not warrant such a rendering. Major Cunningham has since examined the original inscription and has satisfied himself that the word is *Kālindī* (*Bhilsa Topes* 163.)

† J. A. S. B. VII. 632.

‡ I insert the entire passage. “*Budha Gupta* the very name that is found on the inscription on *Bhīm Sen’s* Pillar at *Erun*, near *Ságor*. Assuming this designation to be correctly read, the collateral evidence derived from the inscription coincides sufficiently with the indications offered by the coins themselves. From the former we gather that *Budha Gupta* held the country lying between the *Nerbudda* and a river it has been proposed to identify as the *Jumna*; no information is however afforded as to the whereabouts of his seat of government, nor can the geographical boundaries, thus defined, be said to convey any very definite knowledge of the real extent of the dominions adverted to. Prinsep considered that *Surashtra* should be held to have constituted a portion of this king’s possessions, but the expressions in his own translation of the inscription—even admitting it to be an accurate rendering—are far from implying any such condition; the occupation of land touching these two rivers, taking *Ságor* as anything like its centre, would encircle comparatively narrow limits, and would not by any means of necessity embrace the whole land to the western coast.

If *Budha Gupta* is to be looked upon as a scion of the ancient family of the *Guptas*, whose might is chronicled on the *Láts* of *Allahabad* and *Bhitári*, and on the *Rock of Junagarh*, it is clear by his subjects’ own showing, that he possessed a sovereignty much reduced in extent from the empire originally ruled over by his predecessors in the palmy days of the race.

In addition to the Pillar record, there is also an inscription on the temple at *Eran*, near which the Pillar itself was erected. From the incidental notices to be found in these monumental writings, it would appear that their execution must have been very nearly contemporaneous; the one work having been undertaken “by,” the other at the “cost of,” a certain *Dhanya Vishnu*. In the temple inscription, which is probably the earliest of the two, it is stated that the edifice itself was built in the first year of the reign of *Tárapáni*, the suzerain then acknowledged in this part of the country. The writing on the pillar, on the other hand informs us, as has been already stated, that at the time of its endorsement, *Budha Gupta* was the lord paramount.” J. R. A. S. XII. 71.

of Taramána's imitation of the Gupta Peacock coins places the matter beyond a question, and would leave me no alternative but to conclude that Toramána *followed* Buddha Gupta, after some considerable interval—but my late admission of Buddha Gupta into the direct succession of the Gupta kings, which has been freely conceded on the absolute identity of the style of his silver money with that of the newly deciphered pieces of Kumára and Skanda Gupta, has already sanctioned the result claimed by the present discovery.

But this unique specimen of Toramána's mintage furnishes us with further matter of speculation, in such portion of the date as still remains on its surface. The cipher for hundreds, which should appear opposite the forehead of the profile, seems to have been worn away in the course of the ordinary currency of the piece. The decimal figure is sufficiently well preserved, and though it would be possible to read it as the *s* for *one hundred*, yet, both its position and its outline alike claim for it the value of *eighty*; lowest in order appears a symbol which equally suggests a remote doubt, and were there any figure or portion of a figure in the space below, it might be taken for a *θ*, but not only is there no cross-bar to complete that sign, but there is a semblance of an up-stroke beyond the second vertical line, which assimilates it with the Gupta unit entered last in the line in the plate of facsimiles.

If these interpretations be correct, we have Budha Gupta dating up to 165, and Toramána issuing coin in what we may fairly conclude to be *one hundred and eighty odd*, or about the very period that might have been selected for his epoch under other grounds.

The style of the coin legend also demands brief notice. It will be seen that the Gupta numismatic practice of arranging both the short and long vowel *i* above the line of matras, (or more frequently omitting them altogether) is here so far modernized that the short *ī* is brought down before, and the long *ī* after the consonant to which it is attached. The Budha Gupta Inscription at Eran like the Skanda Gupta writing at Kuhāon still continues to use the *old* form of the long vowel, while the Toramána record symbolizes the sound by a character similar to that on the coin.

The short vowel, on the other hand, is already fully subjected to the modified mode of expression in the Buddha Gupta inscription.

The Gujrát copper-plates of later days do not however, accept these new forms, but adhere to the general outline of the ancient superposed vowel.*

Further remarks on the different species of Orang-utan.—By

EDWARD BLYTH.

Our museum having received from Sir James Brooke of Sarawák the superb donation of seven skeletons of large adult Orang-utans, I hasten to communicate the results of my examination of them, as a sequel to my former memoir on the genus published in the 22nd volume of the Society's Journal.

Of these seven skeletons, five are referable to the *Mias Rambí* of Sir J. Brooke; although one of them (a small but full grown female) is marked by himself *M. Pappan*; and another is sent by the new name *M. Chapin*, which is also that of an old female animal, remarkable for its extraordinarily large and vertically elongated orbits. It is probable that this alleged *Chapin* merely represents an individual variation; and Sir J. Brooke states, in his letter announcing the presentation, that some of these skeletons had been labelled by him with the names specified by natives, who, accordingly (as may be supposed in such a case), are not particularly conversant with the osteological distinctions of the different species.

The sixth skeleton is that of an old female of the *Mias Pappan*, with double-crested skull like that of the *male* figured in illustration of my former memoir. It even exceeds that male in size, but the skull is smaller; and the sexual distinctions of the two are unmistakeable. In this female, the epiphyses of the limb-bones, *scapulae*, *ilia*, &c. are thoroughly ankylosed, denoting completion of growth; even the *symphysis pubis* is united (with much irregular deposition of bone externally), and the sacro-iliac symphysis on the right side only. In no other of our Orang skeletons are the

* Wathen, J. A. S. B. VI.

two latter symphises united. Our male *Pappan* had not quite completed his growth; for some of the epiphyses are loose, and others are but partially soldered: those of the *humeri* are fixed and semi-anchylosed; as are also those of the left *radius* and *ulna*; but the epiphyses of the right *radius* and *ulna* are detached; those of the *scapulæ* and *ilia* are fixed but slightly, and those of the *ischia* more extensively. This animal had therefore (as will be attempted to be shown presently) not completed its full growth: the female being much more advanced in age, with its teeth proportionally worn down. On comparison of the skulls of the two sexes, that of the female is seen to be smaller, with the maxillæ less protruded, increasing the facial angle from 32° to 35° ; the zygomatic arch is much less robust; and the longitudinal grinding surface of the upper molars less by $\frac{3}{16}$ in., while that of the lower molars is less by $\frac{1}{4}$ in. than in the youthful male presented by Mr. Nicholls, and by $\frac{1}{16}$ in. than in Dr. Clarke Abel's Sumatran male. In the form of the ascending ramus of the lower jaw, this female specimen more nearly resembles the Sumatran male referred to than any other of our numerous specimens; but the condyle is considerably larger; and, as compared with Mr. Nicholl's Bornean male, the antero-posterior diameter of the ascending angle is much less; being in the Bornean male (on a level with the surface of the grinders) $2\frac{5}{8}$ in.,—in Abel's Sumatran male but $2\frac{1}{4}$ in.,—and in Sir J. Brooke's Bornean female $2\frac{1}{2}$ in. Lastly, this Bornean female presents the very extraordinary anomaly (throughout the series of placental mammalia) of a fourth true molar above and below, though on the left side only: that of the upper jaw being of small size and round form, its crown scarcely exceeding that of an upper false molar of *MACACUS RHESUS*; and it is placed posteriorly to the ordinary last true molar on a line with its outer surface, that tooth having been pressed a little inward: in the lower jaw the accessory fourth true molar is very little smaller than the normal molars; and it projects from the internal margin of the anterior surface of the ascending angle of the jaw, its crown being directed obliquely inwards much more than forwards or upwards: as a functional tooth, it must, therefore, have been almost useless; though the outer or upper margin of its crown is a little worn down by attri-

tion, as is also the outer cusp of the small accessory molar above. This old female *Pappan* had been badly wounded in its day; having had its left humerus severely fractured, and the fibula of that side also broken; the fractured bones having healed; the unset humerus, however, in an extraordinary manner, exhibiting two large and deep perforations in the great lumpy mass of united bone, where suppuration had ensued, and large shot had probably been ultimately discharged from the orifices.

The seventh skeleton is that of a species altogether distinct and new! Although that of a large old male, with the cranial sutures much obliterated, and the ankylosis of the epiphyses of its limb-bones complete, it is very remarkable for the comparatively slight protrusion of the jaws, and the consequently increased facial angle; apparently, however, to a greater extent than really, from the flatness of the face, the unusually slight protrusion of the sockets of the upper incisors, and, above all, the elevation of the condyle of the lower jaw raising so considerably the occipital portion of the skull and consequently the auditory orifice. The facial angle does not actually exceed $32\frac{1}{2}^{\circ}$; while in the two *Rambis* (male and female) figured in my former memoir, it is as low as 30° —(this being also Prof. Owen's estimate of his adult skulls of the *Rambi*). The *zygomata* (or cheek-bones) are unusually prominent. The canines, incisors, and the first three upper molars on each side, are exceedingly much worn down by attrition; the canines even to a level with the other teeth: but the circumference of these canines, especially in the lower jaw, is conspicuously less than in males and even large females of the *Rambi* and *Pappan*; though they are proportionally larger than in the *Kassar*. It is further remarkable that the frontal ridges of the skull, instead of uniting upon the vertex to form a single sagittal crest (as in the *Rambi*), or continuing separate and well apart throughout (as in the *Pappan*), approach to contact upon the vertex but without uniting; which is very likely to prove a constant and specific distinction, as the present old male shews much irregular deposition of bone externally to its contiguously double sagittal crest. The long bones of the limbs, though fully as stout as in the *Rambi* and *Pappan*, and about twice as stout as those of our old female *Kassar*, yet probably do not exceed the

corresponding bones of the full grown male *Kassar* in length; being very much shorter than those of the adult *Rambi* and *Pappan*: and this remarkable brevity of limb, combined with the conspicuous differences in the skull and sundry other distinctions, can scarcely be considered otherwise than as indicative of specific peculiarity.

Of the five *Rambis* sent, there is unfortunately no specimen of a male of the largest size, comparable to that of which the skull is figured in the 1st and 2nd plates accompanying my former memoir: but there are two large full-grown females (including that ticketed *Mias Chapin*), and also a full grown female of smaller dimensions (which was labelled *M. Pappan*;) with a male of superior age and stature to the male *Pappan* presented formerly by Mr. Nicholls; and also a young male, with the last molars brought into wear, but which nevertheless had not nearly attained its full growth, which bade fair to rival that of the gigantic Sumatran male already noticed.

The specimen to which the name *Mias Chapin* was attached, appears (as already mentioned) to be a large old female *Rambi*, very remarkable for the enormous size and vertically elongated form of its orbital cavities, which measure 2 in. by nearly $1\frac{3}{4}$ in. across. Its skull is larger, though less massive, than that of the female *Rambi* figured in my former memoir: the muzzle is conspicuously more slender, measuring but $2\frac{5}{8}$ in. in greatest width (outside the canines), instead of $2\frac{7}{8}$ in.: and whereas the coronoid process of the lower jaw in the former specimen is smaller and about on a level with the condyle, in the present example (labelled *Chapin*) the posterior or condyle process is unusually prolonged, and raises the skull (with lower jaw *in situ*) so remarkably, that placing it on a level surface together with the other skull noticed, the zygoma of the so-called *Chapin* not only overlaps that of the other, but its lower edge is about $\frac{1}{16}$ in. higher than the upper edge of the zygoma of the other specimen:* the nasal bones, which in the other are united and ascend to the very summit of the *glabella*, in this skull continue separate, and reach only to the lower portion of the *glabella*. This skeleton is very deficient, wanting the *sacrum* and most of the bones of the hands and feet: but all of the long bones are present, with

* In Prof. Owen's figure of a female *Rambi* skull (*Zool. Trans.* I, pl. 35), the condyle-process is similarly elongated.

the shoulder-blades and rest of the *pelvis*; the epiphyses being completely soldered. The limb-bones are even rather longer than in the great female *Pappan*, and in fact exceed in length those of any other of our full-grown specimens: the *humerus* measuring 15 in.; the *ulna* (to tip of styloid process) $15\frac{1}{2}$ in.; femur $11\frac{1}{2}$ in.; and tibia $10\frac{1}{2}$ in.: circumference of middle of trunk of humerus $3\frac{1}{4}$ in.; and of femur $2\frac{7}{8}$ in. The few digital bones seem to accord in dimensions with the corresponding bones of our male *Pappan*. The extreme length of the *scapula* is $8\frac{7}{8}$ in.; and of pelvis $10\frac{7}{8}$ in.: clavicle 8 in. This specimen is marked as having been procured in Sadong (in Borneo).

The next specimen, which was erroneously marked *Pappan*, we consider to be a small female *Rambi*, though fully mature and even old, as shewn by the almost complete obliteration of the cranial sutures, the ankylosis of the various epiphyses, and the amount of attrition of all the teeth. The cranial ridges are very small; and the sagittal crest is hardly at all raised, but nevertheless exhibits a tendency to rise along the median line of the skull, between the frontal ridges which converge from the temples, and to be prolonged in front, anterior to the convergance of the latter, which takes place unusually far back: the nasal bones are united and singularly minute, actually not rising so high as the wide part of the orbital cavities; and the latter are small and circular, measuring barely $1\frac{1}{8}$ in. every way. The skull considerably resembles that of the female *Rambi* formerly figured, only that the sagittal crest is so much smaller; the *zygomata* being also more raised (in consequence of the greater prolongation of the condyle process of the lower jaw); and the orbits are smaller and more circular, and surmounted by much slighter ridges: consequently the face is flatter, and the sockets of the incisors are also less protruded. The skeleton is unfortunately very imperfect, wanting most of the bones of the hands and feet, and one *tibia* and *fibula*: a portion of the lower jaw, with the canine, first præ-molar, and part of the second, is also lost: but the other long bones are present, and the *pelvis* is complete. Length of *humerus* but $13\frac{1}{2}$ in.; of *ulna* $13\frac{7}{8}$ in.; of *femur* $10\frac{3}{8}$ in.; and of *tibia* 9 in.: circumference of middle of *humerus* $2\frac{7}{8}$ in.; and of *femur* $2\frac{1}{4}$ in.: metacarpal bone of middle finger $3\frac{1}{8}$ in.; metatarsal of

corresponding toe $3\frac{1}{2}$ in.: *os calcis* 2 in. Total length of scapula (with *acromion*) $1\frac{1}{2}$ in.; and of *pelvis* $9\frac{1}{2}$ in.: extreme breadth apart of the *ilia* (or hips) $10\frac{7}{8}$ in.: clavicle $6\frac{1}{2}$ in. This specimen also is marked from Sadong in Borneo.

The third female *Rambi* is of large size and fully mature, with the various epiphyses well soldered: but it has even less trace of sagittal crest than the last; the frontal ridges meeting as far back upon the skull, but not quite uniting, and a small mesial ridge rising between them above the vertex: the orbits are moderately large and a little elongated vertically, measuring $1\frac{1}{2}$ by $1\frac{1}{2}$ in.; and the nasal bones are united and ascend a little into the glabella. Size about that of the first specimen (marked *Chapin*), but the muzzle rather broader or $2\frac{1}{8}$ in. This specimen is nearly perfect: but the face is disfigured by a bullet which had knocked away the inner half of the right orbit and a tolerably large piece from the occiput; which fragments are lost. Length of *humerus* $14\frac{1}{2}$ in.; *ulna* $15\frac{1}{4}$ in.; *femur* $11\frac{5}{8}$ in.; *tibia* $10\frac{1}{2}$ in.: circumference of middle of trunk of *humerus* 3 in.; and of *femur* $2\frac{1}{2}$ in.: metacarpal bone of second or middle figure $4\frac{5}{16}$ in.; first phalanx of ditto $3\frac{1}{8}$ in.; second phalanx $1\frac{1}{8}$ in.: metacarpal bone of thumb $2\frac{1}{2}$ in.; first phalanx of ditto $1\frac{1}{8}$ in.: metatarsal bone of middle toe $3\frac{1}{8}$ in.; first phalanx of ditto $3\frac{1}{2}$ in.; second phalanx $1\frac{3}{4}$ in.: metatarsal bone of hallux $2\frac{1}{8}$ in.; first phalanx of ditto $1\frac{3}{8}$ in.; and ungual (!) $1\frac{1}{8}$ in. Total length of *scapula* $9\frac{1}{4}$ in.; *clavicle* $7\frac{5}{8}$ in.; extreme length of *pelvis* $11\frac{1}{4}$ in.; and extreme breadth of *ilia* 12 in.

The two remaining *Rambis* are males: and the first to be noticed is a young animal, whose skull had obviously not attained its full dimensions, though the last true molars had been brought into wear: but the general massiveness of this skull indicates that the animal would probably have become a male of the largest size: the sagittal crest had begun to rise on a grand scale; and the frontal ridges converge directly to it, although these are scarcely indicated for $\frac{1}{2}$ in. before their junction. The teeth are more crowded than in the full grown animal; the inter-space between the upper canine and outer incisor, which in our large Sumatran male is $\frac{3}{4}$ in., being scarcely $\frac{1}{4}$ in.; and the first false molar, instead of being completely posterior to the canine, advances considerably on its outer surface

posteriorly: in the lower jaw, also, there is a bony inter-space between the canine and first false molar in the large mature male, but not in the adolescent male: nasals partially anchylosed, and continued upward to the lower part of the *glabella*: epiphyses of the *humeri* considerably anchylosed, and also those of the *tibiæ* and *fibulæ*; but not of the *radii* and *ulnæ*. This skeleton also is tolerably complete. Length of *humerus* $14\frac{3}{8}$ in.; of *ulna* $13\frac{3}{4}$ in.; of *femur* 10 in.; and of *tibia* 9 in.: circumference of middle of trunk of *humerus* $2\frac{1}{2}$ in., and of *femur* $2\frac{1}{8}$ in.: metacarpal bone of middle finger (the epiphyses beginning to anchylose) $3\frac{1}{4}$ in.; first phalanx of ditto $2\frac{7}{8}$ in.; second phalanx $1\frac{7}{8}$ in.: metacarpal of thumb $1\frac{7}{8}$ in.: metatarsal of middle toe $3\frac{9}{8}$ in.; first phalanx of ditto $2\frac{3}{4}$ in.; second $1\frac{1}{2}$ in.: metatarsal of hallux $1\frac{3}{4}$ in. Clavicle $6\frac{1}{2}$ in. Extreme length of *scapula* (minus epiphysis) $7\frac{1}{2}$ in.: of *pelvis* (with ischial but not iliac epiphysis) $9\frac{3}{4}$ in.; and extreme breadth at the hips $10\frac{1}{8}$ in.

The next is a mature male, but certainly not of the largest dimensions: being about the size of the great females already described; and not otherwise recognisable from them than by the general massiveness of the skull (which is remarked at the first glance), and less conspicuously than usual in the present instance, by the form of the *pelvis*. The superciliary ridges are much broader than in any female skull; and the *zygomata* equally robust: the sagittal crest is also broad and well developed: nasals distinct, and reaching up to the lower part of the *glabella*. Skeleton tolerably complete; wanting most of the ungual phalanges and some other small bones. Length of *humerus* $14\frac{1}{4}$ in.; of *ulna* (with loose epiphysis) $15\frac{1}{8}$ in.; of *femur* $11\frac{1}{2}$ in.; *tibia* $9\frac{7}{8}$ in.: circumference of middle of trunk of *humerus* $3\frac{1}{2}$ in.; and of *femur* $2\frac{3}{4}$ in.: metacarpal bone of middle finger $4\frac{1}{4}$ in.; first phalanx of ditto $3\frac{1}{8}$ in.; second phalanx $1\frac{1}{2}$ in.: metacarpal of thumb $1\frac{3}{8}$ in.; first phalanx $1\frac{1}{2}$ in.: metatarsal of middle toe $4\frac{1}{2}$ in.; first phalanx of ditto $2\frac{1}{2}$ in.; second phalanx $1\frac{1}{2}$ in.: metatarsal of hallux $2\frac{1}{8}$ in.: clavicle $7\frac{1}{4}$ in.: *scapula* $8\frac{3}{4}$ in.: *pelvis* $10\frac{3}{4}$ in. in extreme length, and $11\frac{1}{4}$ in. broad at the hips. This specimen was marked *Mias Rambis* by Sir J. Brooke; and is also from Sadong in Borneo: the three skeletons received from Sadong having unfortunately been prepared by interment in the

ground; and the present being the most complete of them and otherwise the least injured.

We now come to the female *Pappan* already noticed; which, though of greater size than the male described on a former occasion, with considerably longer and broader *pelvis*, has nevertheless a smaller skull, less prominently developed jaws, and conspicuously smaller teeth: the zygomatic arch is shorter and a little weaker than in the male; but the superciliary ridges and width of the bony orbits are much the same, and in fact there is little further difference between the two skulls: the bony crests on the vertex are less prominent in the female, and they approach to within $\frac{3}{4}$ in. of each other; whereas in the male they remain 1 in. apart where most approximated: length of base of skull, from between the middle incisors to the anterior margin of the occipital foramen, $6\frac{7}{8}$ in. in the male, and $6\frac{1}{2}$ in. in the female: breadth of *zygomata* apart $6\frac{1}{2}$ in. in both. This skeleton is also nearly perfect. Length of *humerus* 15 in.; of *ulna* $15\frac{1}{2}$ in.; *femur* $11\frac{1}{2}$ in.: *tibia* $10\frac{3}{8}$ in.: circumference of middle of trunk of *humerus* $3\frac{1}{4}$ in.; of *femur* 3 in.: metacarpal bone of middle finger $4\frac{1}{2}$ in.; first phalanx $3\frac{1}{2}$ in.; second $1\frac{1}{2}\frac{2}{3}$ in.: metacarpal bone of one thumb 2 in., of the other somewhat less, and bearing a very short first phalanx, only $\frac{7}{8}$ in.; metatarsal bone of middle toe 4 in.; first phalanx 3 in.; second $1\frac{1}{2}$ in.: metatarsal of hallux $2\frac{1}{2}$ in.: clavicle $7\frac{1}{2}$ in.: *scapula* $8\frac{1}{2}$ in. in extreme length: and *pelvis* $10\frac{5}{8}$ in. long, and $11\frac{3}{4}$ in. broad at the hips.

Lastly, we arrive at the new species, which may be designated *PITHECUS CURTUS*. It is perhaps the genuine *Mias Chapin* of the Dyaks. The specimen is decidedly male, and well advanced in years; and the skull has a more anthropoid appearance than that of any other Orang known. This chiefly results from the much reduced prolongation of the muzzle, while the cheek-bones project remarkably, giving a sort of Kal muk expression to the skull! The absolute projection of the maxilla, in a horizontal line carried from the lower margin of the orbital ring, is, in our large Sumatran male *Rambi* skull, fully 3 in.; in the male *Pappan* it is about the same; in the female *Pappan* $2\frac{1}{2}$ in.; in the old female *Kassar* (a much smaller animal) about $2\frac{1}{4}$ in.; and in the great male *CURTUS* barely 2 in.! Extreme breadth of *zygomata* 7 in.: height of the skull, with lower

jaw *in situ*, 11 in.: length, in a straight line, from the summit of orbital cavity to between the incisors, $4\frac{1}{4}$ in. (the same measurement being in the male *Rambi* $5\frac{1}{8}$ in., and in the male *Pappan* $4\frac{5}{8}$ in.): length from occipital foramen to base of upper incisors 6 in. (in the male *Rambi* $7\frac{1}{8}$ in., and male *Pappan* $6\frac{7}{8}$ in.): length of bony palate 3 in. (in the others $3\frac{7}{8}$ in., and $3\frac{5}{8}$ in.): orbital cavities $1\frac{5}{8}$ by $1\frac{1}{2}$ in. across: extreme width of bony orbits apart externally 5 in.: extreme breadth of ascending ramus of lower jaw $3\frac{3}{8}$ in.; height of the condyle $4\frac{1}{8}$ in.; length of grinding surface of the upper molars $2\frac{1}{16}$ in. The skeleton is fortunately nearly perfect. Extreme length of *humerus* $13\frac{1}{4}$ in.; *ulna* $14\frac{3}{16}$ in.; *femur* $10\frac{3}{16}$ in.; *tibia* $9\frac{3}{8}$ in.: circumference of middle of trunk of *humerus* $3\frac{1}{4}$ in.; of *femur* $2\frac{7}{8}$ in. (length and circumference of *humerus* of old female *Kassar* $12\frac{3}{4}$ and $2\frac{1}{4}$ in.; ditto of *femur* $9\frac{7}{8}$ in. and $2\frac{1}{4}$ in.): length of metacarpal bone of middle finger $3\frac{7}{8}$ in.; first phalanx of ditto $2\frac{1}{8}$ in.; second $1\frac{1}{8}$ in.; metacarpal bone of thumb $2\frac{1}{16}$ in.; first phalanx $1\frac{1}{8}$ in.; metatarsal bone of middle toe $3\frac{1}{16}$ in.; first phalanx $2\frac{3}{4}$ in.; second $1\frac{5}{8}$ in.; metatarsal bone of *hallux* 2 in.; clavicle $6\frac{7}{8}$ in.: extreme length of *scapula* $8\frac{3}{4}$ in.: of *pelvis* $10\frac{1}{8}$ in.; and breadth at the hips 11 in. Length of the vertebral column, from atlas to *sacrum*, measured internally, $16\frac{1}{4}$ in.; in the scarcely full grown male *Pappan*, $17\frac{1}{8}$ in., and in the old female *Kassar*, $15\frac{1}{4}$ in.: *axis*-vertebra soldered to the next. As compared with the *Rambi* and *Pappan*, the metacarpals and metatarsals are shorter, and the first phalanges of the fingers and toes are longer.*

* A friend who has resided long in Borneo, and has examined numerous skulls of Orang-utans (including those which have passed through the hands of Sir J. Brooke), informs me that he has remarked that, in the adult and aged specimens of the *Rambi* and *Pappan*, the canines are always perfect; whereas in those of the small *Kassar* they are as regularly broken or worn down to about a level with the incisors. This remark is borne out by the series of skulls now under examination. The canines are long and unbroken in all the specimens of the *Rambi* and *Pappan*; and are ground down in the old female *Kassar*, and also in the old male *P. curtus*! Denoting probably a difference of food. Moreover, the same gentleman informs me that different species of these animals do not appear to inhabit the same district; and he thinks that the *P. OWENII* represents, in the southern part of the great island, the *P. MORIO* of the northern part.

With the grand series of skulls and skeletons of adult Orang-utans now subjected to examination, amounting to twelve in all (*viz.* 3 males and 4 females of *PITHECUS BROOKEI* or *Mias Rambi*, 1 male and 1 old female of *P. SATYRUS* or *M. Pappan*, one old male of the *P. CURTUS* or *M. Chapin*?, an old female of the *P. MOBIO* or *M. Kassar*, and the adolescent female with short fore-arms, provisionally designated *P. OWENII*,—in addition to Prof. Owen's excellent lithographs of the male *Kassar* and of male and female *Rambi* in the *Trans. Zool. Soc.*, Vols. I and II), the observer is first struck with the very obvious and conspicuous distinctness of the comparatively puny *Mias Kassar*, and of the adolescent small skeleton, from all the rest. The next glance suffices to separate the *Rambi*, *Pappan*, and *P. CURTUS*: the last being quite as thoroughly distinguished apart by the *tout ensemble* of its appearance, as the *Pappan* is by its conspicuously double-crested vertex. I should think that no zoölogist, accustomed to the discrimination of specific characters, would hesitate, with the present series of skulls before him, to acknowledge the distinctness of each of these three; but such an observer would ponder for awhile over the remarkable female *Rambi* skull with enormous and vertically oblong orbits, and would doubtless hesitate in regarding it as specifically identical with the old female *Rambi* of small size; so great is the contrast between them. Presuming, however, that he arrived at the conclusion here ventured upon, it still follows that the *Rambi* is subject to an extraordinary amount of variation for a wild animal; and this, although it may not invalidate the opinion of its distinctness from the *Pappan* and *P. CURTUS*, nevertheless prompts a reconsideration of the grounds for the view formerly expressed, with regard to the specific distinctness of the small specimen having short fore-arms. From the detached state of the epiphyses of its limb-bones, it is certain that that specimen was not full-grown; and as those of the *ulnæ* at least (as shewn by the skeleton of the adult male *Rambi*, and also by that of the male *Pappan*,) are the last to become anchylosed, it should follow that the fore-arm continues to increase in length after the upper arm and the leg had ceased to grow: but the difference is still too great to be thus accounted for satisfactorily: and upon re-comparison of this specimen with the undoubtedly aged female *Kassar*, I deem it

prudent to await the further evidence which Sir J. Brooke has kindly promised that he would endeavour to procure and send, before venturing to confirm or modify my previously expressed opinion on the subject.

This fact would appear certain, that the partial ankylosis of the epiphyses of the limb-bones does not rigorously denote cessation of growth: unless the female Orangs attain to greater stature than the males, which is most unlikely. It would seem rather, that as the earthy salts are continuously absorbed and re-deposited, some continuance of extension supervenes, until finally checked and stopped by the considerably increased deposition of bone. The skull also continues long to increase in size, after the last true molars have been brought into use.

As regards the sexual distinction, a practised eye discerns it readily in the adult skull, by its superior general massiveness in the male; and, in the skeleton, the larger and broader *pelvis* of course denotes the female animal, combined with a proportionally smaller and less robust skull than in the other sex. 'There is no reason to doubt the correct determination of sex in any one of the specimens here noticed.

The occasional but rare occurrence of the unguinal phalanx to the *hallux* or great toe, would seem to be proper to no particular sex or species; for it exists in our male *Pappan* from Sumatra, and in our female *Rambi* from Borneo.

It now remains to connect the osteological with the external characters of the different species; to determine the stature attained by the largest males of the *Rambi*, *Pappan*, and also *Kassar*, to obtain further information of the *PITHECUS CURVUS*, and to verify or otherwise the *P. OWENII*. With the powerful aid of the accomplished Raja of Sarawak, we trust to be enabled ere long to resolve these various problems.

Indian Oology.—By W. THEOBALD, *Junr. Esq.*, Calcutta, October, 1855.—(Continued from Vol. xxiii, p. 608).

- 1 *Milvus ater*, Calcutta, October 4th, 3. O. P. Greenish-white, spotted and blotched with pale reddish brown: nest of sticks, bulky, placed in tall trees.
2.21
1.68
- 2 *Gyps bengalensis*, near Deoghur, November 4th, 1. O. P. Pure white.
3.20
2.52
- 3 *Buceros cavatus*, Tenasserim, February 3rd, ... 1. O. P. Pure white.
For the measurement of an egg, I am indebted to 2.68
Capt. Tickell, who was fortunate enough to observe
the female on the nest. 1.88
- 4 *Buceros subruficollis*, Tenasserim, February 3rd, ... 3. O. P. Pure white.
2.20
Mode of incubation said to be similar to the last.
- 5 *Haleyon smyrneensis*, Mergui, March 4th, ... 1.55
5. B. D. Pure white.
1.20
Gallery 1½ feet in a stiff bank, near a road.
1.03
- 6 *Haleyon gural*, Monghyr, June 4th, ... 4. R. Pure white.
1.09
Gallery 1 foot in a stiff bank in jungle.
1.02

- 7 *Merops erythrocephalus*, Mergui, March 3rd, ... 5.6 B. O. Pure white.
 0.84
 —————
 0.76
 Gallery from 1 to 7 feet in length, in soft sandy soil near water. It enters the ground at a small angle and then runs horizontally.
- 8 *Eudynamys orientalis*, Monghyr, June 3rd, ... 1. O. P.³ Pale dirty green, much blotched with reddish brown. I had but one egg brought, and the man reported four crow's eggs in the same nest.
 1.20 ;
 —————
 0.90
- 9 *Centropus rufipennis*, Monghyr, June, ... 4. O. Pure white: nest placed in dense trees, a neat but loose structure of twigs domed, and with aperture in the side lined with dried leaves.
 1.30
 —————
 1.09
 August, .. 1.47
 —————
 1.21
- 10 *Cypselus affinis*, Monghyr, May, June, ... 4. O. P. Pure white: nest described in a former paper. Mr. Layard, however, describes it as building a *mud* nest in Ceylon (vide Annals for 1853, page 311).
 0.90
 —————
 0.56
- 11 *Cypselus balasiensis*, Monghyr, June 3rd, ... 3. L. P. Pure white: nest of vegetable down, with a few feathers agglutinated with mucus to the frond of the *Borassus*.
 0.80
 —————
 0.45
 Prome, July, ..

12	<i>Corvus culminatus</i> , ...	Tenasserim, February 3rd, ...	O. P.	1.66	Dull asparagus-green, much blotched with brown.
		Near Deoghur, March 4th, ...	1.15		Nest carefully placed in tall trees.
13	<i>Acridotheres tristis</i> , ...	Monghyr, June 1st, ...	5. O. P.	1.20	Pale green. Nest in trees or holes in houses, of grass and rubbish.
		Prome, July 3rd, (2nd brood)	0.85		
14	<i>Sturnus contra</i> , ...	Monghyr, May 3rd, ...	5. O. P.	1.10	Clear pale green. Nest of grass and twigs in trees.
		June 3rd, ...			
		Tavoy, April 1st, ...	0.82		
15	<i>Malacocercus bengalensis</i> , ...	Monghyr, June 2nd, ...	5. B. O. P.	1.00	Deep bluish green. Nest of twigs and fibres in bushes.
	"Fat-gobria," "Gogai,"			0.79	
16	<i>Malacocercus caudatus</i> , ...	Monghyr, June, July, ...	4.5		Nest and eggs, previously described.
			O. P.		
17	<i>Neornis flavolivacea</i> , ...	Darjiling, July 2nd, ...	3. B. O. P.	0.69	Deep dull claret red, with a darker band at broad end.
				0.55	Nest, a deep cup, outside of bamboo leaves, inside fine vegetable fibres, lined with feathers.

- 18 *Orthotomus longicauda*, ...Darjiling, August 4th, .. 4. O. P. Greenish-white, dotted with pale reddish.
Tavoy, May 1st, .. 0.61
Nest, a neat cup of fibre and vegetable down, enclosed in a single leaf, which is secured by stitches of fibre; so as to envelope its entrance at the top and beneath the stalk, the leaf serving as an admirable pent-roof to the nest.
- 19 *Thamnobria cambaiensis*, ...Monghyr, April 2nd, ... 3.4 ... Greenish-white, ringed and spotted with pale reddish, with some spots of neutral. Nest rude, in holes, in trees and banks, of grass and nearly always snake-skin.
June 3rd, .. O. P.
0.64
- 20 *Hirundo domicola*,Tenasserim, April 2nd, .. 3. L. O. P. White, spotted and ringed with umber. Nest a saucer of mud, inner part coarse roots, profusely lined with feathers and vegetable down, attached to the under part of "snags" projecting some $\frac{1}{4}$ feet above the water.
3.77
0.52
- 21 *Hirundo sinensis*,Salween R., January 2nd .. 4. O. P. Pure white. Nest of grass and lined with feathers.
0.62
0.48

22	<i>Pycnonotus hemorrhous</i> ,.....Monghyr, June 4th,...	3. O. P.	Nest and eggs like <i>P. bengalensis</i> , previously described; eggs not quite so highly coloured.
		0.90	
		0.68	
23	<i>Nectarinia flammaxillaris</i> , ...Tavoy, February 1st,...	2. O. P.	Pale greenish, speckled with greyish ash. Nest, a neat purse, in a lime tree (<i>Citrus</i>), like <i>N. asiatica</i> .
		0.56	
		0.43	
24	<i>Macropygia leptogrammica</i> , ...Darjiling, July 2nd,	0.-(1?)	Dirty white: nest, a few sticks.
		1.40	
		0.98	
25	<i>Francolinus sinensis</i> (var. <i>Phayrei</i>), ...Burmah, June 4th, (Miadeh),...	4. R. P.	Uniform greenish-cream; on the ground.
		1.40	
		1.15	
26	<i>Turnix ocellatus</i> ,Monghyr, June 1st,...	4 R. P.	Yellowish-grey, closely freckled with dark yellowish grey, blotched with deep reddish-umber with a few dots of neutral: on ground.
		0.88	
		0.74	

27	<i>Glareola lactea</i> , Tenasserim, March 3rd, ...	B. P. (3 ?)	Dusky buff, ringed and spotted with obscure neutral, and irregularly lined with yellowish brown. On churs and river sand-banks.
		1.01	
		—	
		0.81	
28	<i>Edicnemus crepitans</i> , Deoghur, April 1st, ...	2. O. P.	Pale stone-colour or yellowish cream, blotched with deep red brown.
	("Nonaru," "Pitis.")	1.80	
		—	
		1.35	On ground in sal jungle.
29	<i>Hoplopterus ventralis</i> , ... Tenasserim, March 3rd, ...	3. P.	Yellowish stone-colour or creamy nankeen, regularly spotted with deep red brown and sparingly blotched with neutral.
		1.60	
		—	
		1.17	On sand-banks in the river.
30	<i>Metopodius indicus</i> , Monghyr, August, ...	L. O. P.	Clear brownish-ochre, strongly lined and streaked with black,—nest of weeds in jheels.
		1.50	
		—	
		0.97	
31	<i>Hydrophasianus chirurgus</i> , ... Monghyr, August 2nd, ...	4. P.	Clear brownish or greenish bronze : nest, weeds in jheels.
		1.33	
		—	
		1.10	
32	<i>Ciconia leucocephala</i> , Deoghur, June 4th, ...	3. P. O.	Dull white : nest of sticks placed in tall trees, usually "simul," most difficult to ascend.
	"Jhangl."	2.50	
		—	
		1.90	

33	<i>Herodias intermedia</i> , ...Monghyr, July 1st, 2nd, ...	6. O. P.	Full green. Nest small, of sticks; in company with "Mainas" and Nos. 34 and 35.
		1.76	
		1.26	
		1.94	
		1.30	
34	<i>Herodias garzetta</i> ,.....Monghyr, July 1st,...	6. O. P.	Full green, nest as above—No. 33.
		1.45	
		1.14	
		1.58	
		1.11	
35	<i>Herodias bubulcus</i> ,Monghyr, June 1st, ...	6. 8. P. O.	Very pale green or greenish-white. Nest as above—No. 33.
		1.80	
		1.39	
36	<i>Porzana phoenicura</i> ,Monghyr, August 1st, ...	7. L. O. P.	Dark brownish-cream, much spotted and blotched with brownish-red. • Nest of weeds in jheels.
		1.70	
		1.10	
37	<i>Gallinula Burnesii</i> ,Salt Range, August 4th, ... (previously described as <i>Gallinula chloropus</i>),	1.62.....	Pinkish cream or grey, spotted and ringed with deep red brown. Nest of weeds in jheels.
		1.15	

38 *Dendrocygna awsuree*, ... Monghyr, August 1st, ... 8. O. P. Creamy white: nest of weeds in
1.81 jheels.

1.50

39 *Nettapus coromandelianus*, Monghyr, August 1st, ... O. Pure white, shell very thin.
1.47

1.10 :

Indian Oology.

[No. 6.]

(NOTE.—The nomenclature used above is derived from the valuable catalogue of birds in the Museum of the Asiatic Society, by Mr. Blyth; a work of great labour, which reflects the utmost credit on its author.)

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,

FOR AUGUST, 1855.

At an ordinary general meeting of the Society held on the 1st inst. at the usual hour,

SIR J. W. COLVILLE, Kt. President, in the chair.

The President introduced to the meeting the Rev. Dr. Anderson of the American Oriental Society.

The minutes of the last month's proceedings were read.

Mr. Houstoun called the attention of the chairman to certain entries which he thought were incorrect. The chairman explained that they were generally correct but added the words: "The question was put and carried." The proceedings were then confirmed; when Mr. Houstoun handed in the following protest:—

"I protest against the above as a most incorrect and improper statement."

Presentations were received—

1. From Lt. Harris, one of a trove of 400 copper coins found whilst excavating earth for embankment purposes near Tankpanee, in the Púri district.

2. From the Secretary to the Board of Revenue, specimens of minerals, earths and gold dust sent down by Col. Hanney from Upper Assam.

3. From the Imperial Academy of Bordeaux, through Messrs. Gillander, Arbuthnot & Co., two Nos. of its Proceedings for 1854.

4. From H. B. Maddocks, Esq. Deputy Commissioner, Battala, a trove of copper coins found at Gurudáspur.

Lt. R. Stewart, 22nd N. I., duly proposed and seconded at the last meeting, was balloted for and elected an ordinary member.

In accordance with the reference made at the last meeting the Council submitted the following report on the motion of Mr. Houstoun to the effect that he may be permitted to have access to all papers, the property of the Society.

"The Council reports that the papers, which are the property of the Society, are :

"1st. The Journal Books which contain a record of the proceedings of the Society, of the Council, and of the different Sub-Committees or Sections.

"2nd. The Minutes recorded by the members of the Council or the Sub-Committees and Sections upon questions circulated for decision or consideration.

"3rd. All the correspondence of the Society filed, including copies of the letters written by the Secretary in answer to communications to him, and all the accounts of the receipts and expenditure of the Society, and reports addressed either to the Society or to the Council or Sub-Committees.

"4th. MSS. of papers published and intended to be published in the Journal and not returned to the authors.

"The rules are silent except as to the 1st class. The 101st rule expresses only that every ordinary member may have access, at such times as the Library is open, to the Journal Books of the Society and of the Council. The Council are of opinion that this rule fairly construed, includes also the records of the proceedings of the Committees.

"The Council are further of opinion that every ordinary member ought also to have access to the documents of the 3rd and 4th classes; but that the minutes of members of the Council or of Committees ought not to be inspected as of course; but only on application to the Council for their production, subject to an appeal to a general meeting of the Society, should the Council decline to sanction their production.

"The final decision on every question determined in circulation should be entered in the Journal Books."

Mr. Houstoun stated that after he had seen the above report in the printed proceedings, he would state his further views

Mr. Houstoun presented for the Society's archives on behalf of Mr.

Charles R. Prinsep, two papers found amongst the papers of the late James Prinsep. The one a letter dated Dacca, 16th April, 1838, from L. R. Stacy to the late James Prinsep, on a sculpture, commemorative of Buddhist ascendancy, purchased near Muttra; the other paper was on the birth of Buddha by J. Low, and revised by him in Province Wellesley, in July, 1837; both papers being understood to be the manuscripts of communications published by the Society.

Mr. Houstoun stated he had a great number of other papers which he proposed similarly presenting to the Society, as soon as the labours of other members, now engaged on them, enabled him to do so.

Mr. Houstoun brought to notice and presented to the Society a copy of a paper by Mr. H. T. Prinsep, proposing the publication, by the two principal Pandits of the late J. Prinsep, in a work as particularized in the paper; all the inscriptions of Aṣiā already published or remaining to be published by the Asiatic Society or elsewhere as far as obtainable, and gave notice that he would at the next meeting move:

1. To be informed if the original paper was with the Society, and if so, that it be produced and published in memory of the high services and eminent attainments of the late J. Prinsep and in compliment to his family, and as a step towards obtaining the co-operation of the public to Mr. H. T. Prinsep's object, as many parties would gladly aid in that object; and he further called for the production of any traces there might be of any such paper, if the original were not with the Society or to be found, as his copy appeared to have been taken from an unrevised draft; and asked for a statement of the step that had been taken in consequence of, or any way appertaining to, the object of that paper, and also proposed that the particular aid he would specify and every aid, inducement and encouragement, be given to the only surviving one of the two pandits to undertake such a work, and to any one else if that party cannot now undertake it.

2. For the production of all Mr. Heatly's unpublished contributions towards the development of the mineral resources of India, and a list of all unpublished MSS. in the Society's possession, and

that the whole of all such manuscripts be made accessible to the members during the hours prescribed for the attendance of the Librarian and other servants of the Society.

3. To ask what had been done in consequence of an intimation he understood to have been circulated some years ago amongst the members of the Society, regarding the publication of fresh maps of the Soonderbunds, and for the production of all papers given in by any one on that subject.

4. That all duplicates or supposed duplicate fossil and other remains in the Society's possession be offered to the Hon'ble the Court of Directors for their disposal, he understanding the Hon'ble Court to have expressed a wish for such, and at the same time to be informed who is individually responsible that proper measures are taken for the proper preservation of the fossil and other remains in the Society's possession, considering a joint responsibility, no security at all that such remains will be properly taken care of, constant complaints being made that the Society's property is not cared for as it should be.

5. That the whole of the fossil and other remains be placed under the sole charge and responsibility of the Curator of Economic Geology, as appertaining to his Department, and the Curator be called upon to report, after consultation with competent parties, what measures he would require to be taken to secure the proper preservation of the whole of those relics, and, especially, what is considered the best coating for preserving them, and fossil shells and bones, and teeth of mammalia, and whether a coating with a mucilage of gum tragacanth is not the best and a sufficient means of preserving such relics, if they are first saturated with it.

Communications were received—

1. From Dr. Wright, enclosing the following particulars of a luminous appearance of the sea in Lat. $11^{\circ} 27'$; Long. $105^{\circ} 40'$ E. observed on Thursday the 27th of July, 1854.

Hong Kong, June 6th, 1855.

To the Secretary of the Asiatic Society.

DEAR SIR,—A short time since, I had an opportunity of examining some Nos. of your Journal and find (Journ. No. II. 1854 p. 206,) that you solicit farther notices of such phenomena as Capt. Bowen has given

you on the preceding page. Accordingly I send you the following copy of notes taken immediately after witnessing the phenomena they describe.

Ship "Shooting Star" bound from N. Y. to Hong Kong. Thursday, July 27th, 1854. Lat. $11^{\circ} 27' N.$; Long. $105^{\circ} 40' E.$

7 $\frac{1}{2}$ P. M. A little cloudy on the horizon, but very clear, bright star-light, fresh breeze. Air $73^{\circ} F.$ Ship entered light colored water, and in about 15 minutes, the sea as far as the eye could reach, appeared like an immense field of snow, no ripples, but smooth like oil, so that when the ship's bows threw up a ripple it immediately fell back to its former level. Orders were given to heave the lead, when 60 fathoms found no bottom. The light from the water illuminated objects on deck and dimmed all stars within 20° of the horizon. Looking over the widest part of it, the horizon appeared like a dim Aurora Borealis. Ship's head North. Sailed 13 miles through this patch, then $\frac{1}{2}$ a mile through ordinary colored seawater, and again through another patch of 10 miles of light water: limits of light water, well defined.

Dipped up deck a tub full of this water, and found it $78\frac{1}{2}^{\circ}$, same as water in the morning. The tub presented a brilliant sight, being filled with bright self-luminous serpentine animalculæ, varying from half an inch to five inches in length. Examined carefully in the hand, by the light, they were found to be nearly transparent, about the size of a hair in the middle, and tapering a little towards each end; of a jelly-like substance which burnt in the candle with a red light, and crisped like burnt whalebone. A few were differently formed. Two were found capable of propelling themselves through still water in a tumbler. One of these was in the form of a concentric ring half an inch in diameter, with teeth-like projections on the inner edge, and seemed to propel itself by contracting the diameter of the ring: it was preserved alive about 36 hours.

This examination satisfied me that the light is emitted by animalculæ, but I am most anxious to know if scientific men can explain *why* it appears at *certain times* and within such *prescribed limits*.

Your's truly,

A. R. WRIGHT,

Surgeon, P. and O. Co's.

S. S. "LADY MARY WOOD."

2. From Mr. Secretary Melville, India House, stating that the Hon'ble the Court of Directors have acceded to the Society's request for a set of casts of Indian Fossils in the India House Museum, and

directed Dr. Horsefield to prepare and forward the same to the Society's Agents in London.

3. From E. Thomas, Esq. forwarding a paper entitled "On the Epoch of the Gupta King."

4. From Bábu Rádhánáth Sikdár, enclosing abstracts of Meteorological Registers kept at the Surveyor General's Office, Calcutta, for the month of April last.

The Librarian submitted his usual monthly report.

Captain Thuillier then, on the invitation of the Chairman, explained to the meeting what had led to the Mission of the brothers Schlagintweit to the Himalayas—reading extracts from letters recently received from Mr. Adolphe Schlagintweit and showing the route by which he and his brother Robert had reached Milney in North Kemaon.

Confirmed 5th September, 1855.

R. G. GHOSE, V. P.

LIBRARY.

The following additions have been made to the Library since the last meeting.

Presented.

Die Lieder des Hafis. Persisch mit dem Commentaire des Sudi, Herausgegeben von H. Brockhaus. 1 en bandes 1 es heft.—BY THE EDITOR.

Natuurkundig Tijdschrift voor Nederlandsch Indie, Deels VIII. et VI. aflevering I. et II.—BY THE EDITOR.

Papers regarding the cultivation of Hemp in India, *Agra*, 1855, 8vo. pamphlet.—BY THE GOVERNMENT OF THE NORTH WESTERN PROVINCES.

Selections from the Records of the Government of the North Western Provinces, No. XX.—BY THE SAME.

Selections from the Public Correspondence of the Punjab Administration, No. XI. 4 copies.—BY THE CHIEF COMMISSIONER.

Selections from the Records of the Madras Government, No. V.—BY THE GOVERNMENT.

Selections from the Records of the Bengal Government, No. XX.—BY THE GOVERNMENT OF BENGAL.

Report on the Administration of the Salt Department of the Revenue of Bengal, for the year 1853-4.—BY THE SAME.

The Journal of the Indian Archipelago, from Oct. 1854 to March, 1855, 2 copies each.—BY THE SAME.

The Oriental Christian Spectator, for May and June, 1855.—BY THE EDITOR.

The Oriental Baptist, No. 102.—BY THE EDITOR.

The Calcutta Christian Observer, for June, 1855.—BY THE EDITORS.

Zeitschrift der Deutschen morgenländischen Gesellschaft IX. Band II. heft.—BY THE EDITOR.

The Upadeshak, No. 102.—BY THE EDITOR.

Bibidhārtha Sangraha, No. 36.—BY THE EDITOR.

Recueil des Actes de l'Academie imperiale des Sciences de Bordeaux, Nos. 1-2 of 1854.—BY THE ACADEMY.

The Durbeen, a Persian newspaper, for June and July, 1855.—BY THE EDITOR.

Exchanged.

The Calcutta Review, for July, 1855.

The Athenæum, for April and May, 1855.

Journal Asiatique, October, 1855.

Journal of the Agri-Horticultural Society of India, p. 1. Vol. IX, *

The Philosophical Magazine and Journal of Science, March and May, 1855.

Purchased.

The North American Review, No. 167.

The Westminster Review, No. XIV.

The Quarterly Review. No. for April, 1855.

The Edinburgh Review. No. for April, 1855.

The Annals and Magazine of Natural History, Nos. 87-88.

The Literary Gazette, Nos. 1981 @ 1999.

Revue des Deux Mondes, 1er Mai, 1855.

L'Athenæum Français, 5 Mai, 1855.

Kaivalyanvanita, A Vedanta Poem : the Tamil Text with a Translation or Glossary, and Grammatical Notes ; to which is added, an Outline of Tamil Grammar, with specimens of Tamil structure, and comparative Tables of the Flexional system in other Dravida languages, by C. Græul, London, 1853, 8vo.

Journal des Savants, Fevr. Mars. et April, 1855.

Comptes Rendus, Nos. 3—18 except 14.

The Mahābhārata translated into Bengali by Kúsirām Dāsa, Purnachandrodaya Press, 1 vol. 8vo.

The Sabdāmbudhi, a Bengali Dictionary, 1 vol. 8vo.

Addy's Anglo-Bengali Dictionary, 1 vol. 8vo.

—— Translation of the Arabian Nights, 1 vol.

The Shah-nameh, translated into Bengali by Bisweswar Datta, 1 vol. 8vo.
 Baidyanáth Banerjee's History of Hindustan, in Bengali 1 vol. 8vo.

The Chaitanya Chandrodaya Nátak, in Bengali, 1 vol.

Panjúbetihása, or a History of the Punjab, in Bengali 1 vol. 8vo.

Shyámácharan's Bengali Grammar, in Bengali 1 vol. 8vo.

Rákháldás Húldar's History of Ráma, in Bengali 12mo.

Macauley's Life of Lord Clive, translated into Bengali, by Hurchunder Dutt, 1 vol. 12mo.

Manatattwasúra, or Combe's Principles of Phrenology, in Bengali 12mo.

Encyclopædia Bengalensis, 12 vols. 12mo.

A Narrative of the Persecution of the Christians in Madagascar with details of the escape of the six Christian Refugees now in England. By J. J. Freeman and D. Johns, *London*, 1840, 12mo.

Journal of a March from Delhi to Peshawar, and from thence to Cabul with the Mission of Lt.-Col. Sir C. M. Wade. By Lt. W. Barr. *London*, 1844, 12mo.

Narrative of a Mission to Bokhara in the years 1843-45, to ascertain the fate of Colonel Stoddard and Capt. Conolly. By the Rev. J. Wolff, *London*, 1844, 8vo. 2 vols.

• Journal of an Embassy from the Governor-General of India to the Courts of Siam and Cochin China, exhibiting a view of the actual state of those kingdoms; by John Crawford. Second Ed. *London*, 1830, 8vo 2 vols.

Travels in Circassia, Krim, Tartary, &c. including a steam voyage down the Danube from Vienna to Constantinople, and round the Black Sea. By E. Spencer. Third Ed. *London*, 1839, 2 vols. 8vo.

Travels and Researches in Asia Minor, Mesopotamia, Chaldea and Armenia, by W. F. Ainsworth, *London*, 1842, 2 vols. post 8vo.

The History of Bahawalpur with notices of Sindh, Afghanistan, Multan, and the West of India, by Shahámet Ali. *London*, 1843, post 8vo.

Voyages of the Dutch Brig of War 'Dourga,' through the southern and little-known parts of the Moluccan Archipelago, and along the previously unknown South Coast of the New Guinea, performed during the years 1825-26, by D. H. Kolff, Junr. Translated from the Dutch by G. W. Earl. *London*, 1840, 8vo.

Memoir of the Countries about the Caspian and Aral seas, illustrative of the Late Expedition against Khiah. Translated from the German of C. Temmermann, by Capt. Morier. *London*, 1840, 8vo.

Personal observations on Sindh, the Manners and Customs of its Inhabitants and its Productive Capabilities. By T. Postans. *London*, 1843, 8vo.

Western India : Reports addressed to the Chambers of Commerce of Manchester, Liverpool, Blackburn and Glasgow, by N. A. Mackey. Edited by J. Robertson, Esq. *London*, 1853, 8vo.

Travels in Luristan and Arabistan, by Baron C. A. de Bode. *London*, 1845, 2 vols. 8vo.

Narrative of a Whaling Voyage round the Globe, from the year 1833 to 1836, comprising sketches of Polynesia, California, the Indian Archipelago. &c., by F. O. Bennett, *London*, 1840, 2 vols. 8vo.

RA'JENDRALA'L MITTRA.

27th July, 1855.

FOR SEPTEMBER, 1855.

At the usual monthly general meeting of the Society held on the 5th instant, at half-past 8 P. M.

BÁBU RÁMGOPÁL GHOSE, Vice-President, in the chair.

The proceedings of the last meeting were read and confirmed.

Presentations were received—

1. From Bábu Rámchandra Mittra, Secretary Bethune Society. Selections from the Bethune Society's Papers, Nos. I. II.

2. From Bábu Rádhánáth Sikdár, Masik Patriká, Nos. 10. to 12.

3. From J. Bedford, Esq. Geological specimens from the copper mines and Geysers of New Zealand.

4. From Capt. C. B. Young, 1st, Specimen of a New Zealand caterpillar, 2nd, Specimen of Kauri gum from New Zealand, and 3rd, the orbiculare bone of a whale's ear.

The following are extracts from Capt. Young's letter and the notes therein alluded to :

"I send you what, I believe, may be new to the Society, and if put on the table at our meeting may elicit some remarks and serve to interest, viz. : a specimen of the grass-tree caterpillar from Australia, whose conversion into woody substance is very curious. It is mentioned by Hooker ; a few lines on the subject accompany, which were written by the gentleman who brought the specimen, Mr. F. M. Hind, B. C. S.

"I also send a specimen of the Kauri gum with a few remarks

from the same gentleman. This is doubtless nothing new, but its mode of formation and collection, which I have also heard of from other visitors to Australia, is interesting and peculiar.

"Lastly, what the Society may perhaps not have in their Museum the bone of a whale's ear picked up at the Cape."

"The caterpillar known as the grass-tree caterpillar burrows, at one portion of its existence, in the Púriri tree, and it is there supposed to contract a disease or rather to become inoculated with the seed of a peculiar grass, which eventually grows out of its head. The animal lives for a time, during which it is supposed that its animal substance is absorbed by the plant, and replaced by another substance identical with the plant itself; when this process has advanced to a certain stage the animal dies, but the process of absorption of animal matter and replacement of vegetable continue until the entire caterpillar has been converted into a ligneous substance. All caterpillars are not so diseased, in fact, those specimens found with the grass growing out of them are exceptions. I have always understood that these are dug out of the ground.

"One or two specimens of the cricket-genus have also been discovered so diseased—but they are very rare.

"The grass-tree caterpillar is only found in certain localities of New Zealand."

"The Kauri gum is found under ground and marks the site of a departed Kauri tree. I have found large lumps of the gum in plains far distant from any forest; and it is generally supposed that places where the gum is found have been forests destroyed by fire. I presume it is the action of the fire which drives the sap of the tree towards the roots, and forms it into the hard substance known as Kauri gum. The wood of the tree burns readily, and time would soon obliterate all signs of the conflagration.

"I have never seen Kauri gum in a living tree."

5. From Dr. Thompson, on behalf of self and Dr. Hooker, a copy of *Flora Indica*, Vol. I.

Recorded a note from Bábu Kissory Chand Mittra, communicating his wish to withdraw from the Society.

Mr. Houstoun did not make the motion of which he gave notice at the last meeting.

The chairman announced to the meeting that Mr. Grote had resigned his post as Secretary to the Society, and that the Council have permitted Mr. H. V. Bayley a member of their body, to hold the office temporarily till the 1st October, unless a successor can be appointed before.

The chairman then, advertng, in some detail, to the valuable services rendered to the Society by Mr. Grote, proposed "that this meeting receive with regret the resignation of Mr. Grote as Secretary of the Society and Editor of the Journal, and that it desires to record its grateful sense of the distinguished zeal and ability with which he has so long discharged the arduous duties of his office."

The resolution was seconded by Mr. Allen.

Capt. Thuillier proposed as an amendment:

"That this meeting have learned with great regret of the sudden determination of Mr. Grote to resign the appointment of Secretary to this Society, and request that he be solicited to waive that determination, and to continue the benefit of his valuable services to the Society."

The Hon'ble F. Drummond seconded the amendment.

Dr. Thompson moved "that the resolution be postponed till the next meeting, in order, that the papers connected with Mr. Grote's resignation may be laid before the Society to enable them to come to a decision in a matter so deeply to be regretted."

On being put to the vote Dr. Thompson's proposition was lost and the first amendment carried.

Communications were received—

1. From the Secretary to the Government of the North-Western Provinces, enclosing copy of a Meteorological Register kept at the Office of the Secretary at Agra, for the months of June and July last.
2. From G. B. Freeling, Esq. submitting an Index to all the numismatic papers published in the Journal of the Society.
3. From Bábu Rádhánáth Sikdár, forwarding abstracts of Meteorological Observations taken at the Surveyor General's Office, in the months of May and June last.

The Librarian submitted his usual monthly report of additions made to the library during the month of July last.

On the conclusion of the regular business of the evening, Mr. Houstoun handed in the following protest:

"I protest against the assumption of the chair by the Chairman on the grounds of his being a Vice-President of the Society, having already protested that no Council has been elected."

Confirmed 3rd Oct. 1855.

RAMGOPAUL GHOSE, V. P.

LIBRARY.

The library has received the following valuable accession to its stores since the last meeting.

Presented.

Memorie della Reale Accademia delle Scienze di Torino, I series, vols. 1 to 6 and 12 to 40, and ii. series, vols. 1 to 12 (2 copies of the last) and 14.
—BY THE ROYAL ACADEMY OF TURIN.

Ramayana poema Indiano di Valmici testo sanscrito secondo i codici manoscritti della scuola Gaudana per Gaspere Gorresio. Parigi, 1844 to 1853, 8 vols.—BY THE SAME.

Fisica de' corpi Ponderabili ossia trattato della costituzione generale de' corpi del cavaliere Amedeo Avogadro. Torino, 1837, 4 vols. 8vo.—BY THE SAME.

Melanges de Philosophie et de Mathematique de la Société royale de Turin. Turin, 1759-73, 5 vols. demi 4to.—BY THE SAME.

Museo Numismatico Lavy appartenente alla Reale Accademia delle Scienze di Torino. Torino, 1840, 2 vols. 4to.—BY THE SAME.

Flora Sardoia seu Historia Plantarum in Sardinia et Adjacentibus insulis vel sponte nascentium vel ad Utilitatem latius exculcarum auctore J. H. Moris. Taurini, 1837, 3 vols. 4to

Analyse grammaticale Raisonnée de differens textes anciens Egyptiens par F. Salvolini, vol. I. Paris, 1836, 8vo.—BY THE SAME.

Essai d'un Parallèle entre les Forces physique et les Forces morales par H. Carena. Turin, 1817, 8vo.—BY THE SAME.

Dizionario Militare Italiano di G. Grassi. Torino, 1817, 2 vols. 8vo.—BY THE SAME.

Rapporto e Osservazione interno alla cura dei Fanciulli Cretini. Torino, 1854, 4to.—BY THE SAME.

Elementi di Storia naturale Generale di Euginio Sismonda. Torino, 1853, 12mo.—BY THE AUTHOR.

Notizia Storica dei Savori fatte dalla classe di Scienze Fissiche e Mathématique nel Corso degli' anno 49 et 53 par E. Sismonda. Torino, 1851-53, 4to.—BY THE AUTHOR.

Osteografia di un Mastodonte augustidente illustrato del E. Sismonda. Torino, 1851, 4to.—BY THE AUTHOR.

Natuurkundig Tijdschrift voor Nederlandsch Indië. Deel, IV. Nos. III, IV.—By THE EDITORS.

Selections from the Records of the Madras Government, No. IX. Reports on Important Public Works, for 1851.—By THE BENGAL GOVERNMENT.

Selections from the Records of the Government of Bengal, No. XIII. Correspondence relating to Suppression of Dacoity in Bengal.—By THE SAME.

The Calcutta Christian Observer, for August, 1855.—By THE EDITORS.

Address at the Anniversary Meeting of the Royal Geographical Society, 22nd May, 1844. By the Earl of Ellesmere.—By THE SOCIETY.

Proceedings of the Royal Society, No. 13.—By THE SOCIETY.

Journal Asiatique, No. 19.—By THE SOCIÉTÉ ASIATIQUE.

The Oriental Christian Spectator, for July, 1853.—By THE EDITOR.

Flora Indica, being a Systematic Account of the Plants of British India, together with Observations on the structure and affinities of their Natural Orders and Genera, by J. D. Hooker and J. T. Thompson, vol. I. London, 1855, 8vo. ••

• *Exchanged.*

The London, Edinburgh and Dublin Philosophical Magazine, No. 61, June, 1853.

Athæneum, for May 1855.

• *Purchased.*

Annals des Sciences naturelles. Paris, 1855, Tome III. No. 1.

Revue et Magazin de Zoologie par G. Meneville, No. 4.

Annals and Magazine of Natural History, No. 90.

Journal des Savants, for May, 1855.

Comptes Rendus, Nos 19 to 23.

Bulletin archéologique de l'Athenæum français, Nos. 1, 4 and 5.

L'Athenæum français, Nos. 1, 6, 10, 11, 12, 13, 15, 16, 17, 19, 20, 21, 22 and 23.

The Literary Gazette, 2000, 1, 2 and 3.

Zendavesta or the Religious Books of the Zoroastrians, edited and interpreted by N. L. Westergaard, vol I. p. iv.

Memoirs of the Life, Writings and Correspondence of Sir William Jones, by the Hon'ble Lord Teignmouth, with the Life of Lord Teignmouth. Selections from Sir William Jones's works, and occasional notes, by the Rev. J. C. Wilks, London, 1835, 2 vols. 12mo.

1st Sept. 1855.

RA'JENDRALAL MITTRA.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May, 1855.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the cistern of the Standard Barometer above the level of the Sea, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.649	29.723	29.566	0.157	87.8	97.7	81.4	16.3
2	.634	.692	.577	.115	87.5	96.6	80.6	16.0
3	.722	.789	.647	.142	86.4	92.9	81.6	11.3
4	.757	.828	.676	.152	86.3	92.8	82.2	10.6
5	.681	.749	.596	.153	85.8	91.9	80.6	11.3
6	<i>Sunday.</i>							
7	.618	.682	.556	.126	87.4	95.4	82.6	12.8
8	.654	.721	.579	.142	87.1	92.8	83.3	9.5
9	.736	.791	.691	.100	86.4	92.9	82.2	10.7
10	.687	.733	.562	.171	84.6	91.2	77.8	13.4
11	.631	.689	.593	.096	85.2	91.0	80.2	10.8
12	.649	.717	.596	.121	84.9	88.9	80.7	8.2
13	<i>Sunday.</i>							
14	.701	.781	.620	.161	87.8	94.6	83.0	11.6
15	.714	.753	.641	.112	83.2	94.4	72.3	22.1
16	.738	.805	.658	.147	81.0	89.9	73.6	16.3
17	.721	.791	.640	.151	83.3	93.6	74.9	18.7
18	.647	.731	.515	.216	83.4	93.3	73.6	19.7
19	.549	.601	.476	.125	87.3	94.4	81.2	13.2
20	<i>Sunday.</i>							
21	.640	.695	.587	.108	88.2	95.4	82.0	13.4
22	.642	.720	.580	.140	88.5	97.4	82.3	15.1
23	.624	.702	.557	.145	90.0	98.1	83.3	14.8
24	.605	.681	.492	.189	89.7	100.1	80.4	19.7
25	.581	.655	.497	.158	87.4	97.2	79.4	17.8
26	.598	.664	.535	.129	88.2	97.5	81.6	15.9
27	<i>Sunday.</i>							
28	.503	.590	.424	.166	77.5	81.2	75.0	6.2
29	.594	.672	.508	.164	82.3	89.5	74.0	15.5
30	.563	.720	.614	.106	81.7	92.4	78.2	14.2
31	.600	.661	.529	.132	87.2	92.9	83.3	9.6

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in the month of May, 1855.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Va- pour in a Cubic foot of Air.	Additional weight of vapour required for complete saturation.	Mean degree of Hu- midity complete sa- turation being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	82.3	5.5	79.5	8.3	0.986	10.49	3.11	.771
2	82.4	5.1	79.8	7.7	.995	.58	2.91	.784
3	81.9	4.5	79.6	6.8	.999	.54	.52	.807
4	81.3	5.0	78.8	7.5	.964	.27	.75	.789
5	81.2	4.6	78.9	6.9	.967	.32	.51	.801
6	Sunday.							
7	82.3	5.1	79.7	7.7	.992	.55	.90	.784
8	81.7	5.4	79.0	8.1	.970	.33	3.00	.775
9	81.5	4.9	79.0	7.4	.970	.35	2.71	.793
10	80.6	4.0	78.6	6.0	.958	.26	.13	.828
11	81.2	4.0	79.2	6.0	.976	.43	.18	.827
12	81.1	3.8	79.2	5.7	.976	.43	.06	.835
13	Sunday.							
14	82.4	5.4	79.7	8.1	.992	.55	3.05	.776
15	78.1	5.1	75.5	7.7	.868	9.31	2.58	.783
16	77.5	3.5	75.7	5.3	.873	.41	1.73	.845
17	78.8	4.5	76.5	6.8	.896	.61	2.32	.806
18	78.9	4.5	76.6	6.8	.899	.63	.33	.805
19	82.7	4.6	80.4	6.9	1.014	10.79	.62	.805
20	Sunday.							
21	82.8	5.4	80.1	8.1	.005	.67	3.09	.775
22	83.3	5.2	80.7	7.8	.024	.86	.02	.782
23	83.7	6.3	80.5	9.5	.017	.76	.74	.742
24	83.1	6.6	79.8	9.9	0.995	.54	.83	.733
25	82.3	5.1	79.7	7.7	.992	.55	2.90	.784
26	82.7	5.5	79.9	8.3	.998	.61	3.15	.771
27	Sunday.							
28	76.5	1.0	76.0	1.5	.882	9.56	0.48	.852
29	78.8	3.5	77.0	5.3	.910	.79	1.79	.845
30	81.7	3.0	80.2	4.5	1.008	10.77	.65	.867
31	84.0	3.2	82.4	4.8	.080	11.49	.88	.859

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Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the Month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the Month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid-night.	29.658	29.754	29.543	0.211	82.3	86.5	74.2	12.3
1	.643	.739	.528	.211	81.8	86.1	74.0	12.1
2	.634	.736	.508	.228	81.5	85.5	74.0	11.5
3	.631	.735	.523	.212	81.3	85.0	73.8	11.2
4	.634	.746	.509	.237	81.0	84.2	73.6	10.6
5	.645	.786	.498	.288	80.9	84.4	73.6	10.8
6	.663	.812	.496	.316	81.0	84.0	73.9	10.1
7	.684	.822	.487	.335	82.1	85.6	74.9	10.7
8	.700	.810	.537	.273	84.2	87.7	77.2	10.5
9	.710	.828	.543	.285	86.5	90.6	77.4	13.2
10	.708	.823	.540	.283	88.8	93.8	76.0	15.8
11	.696	.817	.539	.278	90.5	95.6	78.4	17.2
Noon.	.679	.812	.488	.324	91.9	97.2	78.2	19.0
1	.657	.773	.462	.311	92.6	98.2	77.6	20.6
2	.632	.738	.452	.286	93.0	100.0	77.4	22.6
3	.610	.717	.461	.256	93.1	100.1	78.4	21.7
4	.591	.707	.436	.271	92.2	100.1	79.0	21.1
5	.585	.705	.424	.281	90.4	98.7	79.6	19.1
6	.602	.740	.443	.297	87.8	96.6	72.3	24.3
7	.620	.768	.450	.318	85.5	91.6	75.8	15.8
8	.635	.745	.470	.275	84.1	90.7	74.5	16.2
9	.649	.759	.505	.254	82.9	88.4	74.2	14.2
10	.661	.776	.533	.243	82.9	88.6	74.9	13.7
11	.662	.760	.544	.216	82.5	87.7	74.8	12.9

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Hourly Means, &c. of the Observations and of the Hygrometrical elements
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Hour.	Mean Wet Bulb Thermo- meter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional Weight of Va- pour required for com- plete saturation.	Mean degree of Humidity complete saturation be- ing unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	79.6	2.7	78.2	4.1	0.946	10.17	1.41	0.878
1	79.5	2.3	78.3	3.5	.949	.20	.20	.895
2	79.5	2.0	78.5	3.0	.955	.29	.02	.910
3	79.3	2.0	78.3	3.0	.949	.22	.02	.909
4	78.9	2.1	77.8	3.2	.934	.07	.07	.904
5	78.9	2.0	77.9	3.0	.937	.10	.00	.910
6	79.1	1.9	78.1	2.9	.943	.16	0.98	.912
7	79.8	2.3	78.6	3.5	.958	.30	1.21	.895
8	81.0	3.2	79.4	4.8	.983	.51	.73	.859
9	82.0	4.5	79.7	6.8	.992	57	2.53	.807
10	83.0	5.8	80.1	8.7	1.005	.64	3.36	.760
11	83.6	6.9	80.1	10.4	.005	.62	4.10	.721
Noon.	84.1	7.8	80.2	11.7	.008	.62	.70	.693
1	84.6	8.0	80.6	12.0	.021	.75	.88	.688
2	84.6	8.4	80.4	12.6	.014	.66	5.15	.674
3	84.6	8.5	80.3	12.8	.011	.63	.23	.670
4	83.8	8.4	79.6	12.6	0.989	.41	.04	.674
5	83.2	7.2	79.6	10.8	.989	.45	4.22	.712
6	81.9	5.9	78.9	8.9	.967	.28	3.32	.756
7	80.9	4.6	78.6	6.9	.958	.23	2.49	.804
8	80.2	3.9	78.2	5.9	.946	.13	.08	.830
9	79.4	3.5	77.6	5.3	.928	9.97	1.82	.846
10	79.4	3.5	77.6	5.3	.928	.97	.82	.846
11	79.5	3.0	78.0	4.5	.940	10.09	.55	.86.

Meteorological Observations.

lxxv

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May, 1855.*

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the Sky.
	o	Inches.		
1	133.0		S.	Cloudy till 10 A. M. cloudless afterwards.
2	139.0		S. or S. W. or S. E.	Cloudless.
3	133.4		S. or S. E. High.	Cloudless till 7 A. M. scattered clouds afterwards.
4	143.0		S. E. or S. High.	Cloudy.
5	130.4		S. Sharp.	Cloudy nearly the whole day.
6	Sunday.			Sunday.
7	135.0		S. E. or S. High.	Cloudy till 10 A. M. cloudless till 6 P. M. scattered clouds afterwards.
8	131.1		s. or s. w. or s. High.	Cloudy the whole day, also drizzling at 9 P. M.
9	142.0		S. or S. E.	Cloudy.
10	..		S. E. or S. or E. High.	Ditto.
11	125.0	0.33	S. High.	Ditto.
12	..		S.	Ditto.
13	Sunday.			Sunday.
14	140.1		S. Sharp.	Scattered ci.
15	133.5	0.55	S. or S. E. High.	Cloudy and constantly drizzling.
16	127.5		S. E. or N. E. or E.	Cloudless till 9 A. M. cloudy afterwards.
17	140.6	0.51	E. or S. E. or S.	Cloudy or scattered ci.
18	130.4		E. or N. E. or S.	Cloudless till 10 A. M. scattered ci afterwards.
19	141.5		S.	Cloudless nearly the whole day.
20	Sunday.			Sunday.
21	127.9		S.	Cloudless till 9 A. M. scattered ci till 5 P. M. cloudless afterwards.
22	136.0		S. or S. S. W.	Cloudless till 7 A. M. scattered ci afterwards.
23	142.8		Calm or S. or S. E.	Cloudless till 7 A. M. scattered ci afterwards.
24	141.0	0.33	S. or E. or S. W.	Cloudless till 7 A. M. scattered ci afterwards.
25	133.0		S. or S. E.	Scattered ci till 6 P. M. cloudless afterwards.
26	130.0		S. E.	Cloudless till 5 A. M. scattered ci till 4 P. M. cloudy afterwards also drizzling at 11 P. M.
27	Sunday.			Sunday.
28	..	3.70	W. or W. S. W.	Cloudy and constantly raining.
29	133.0	0.37	S Sharp.	Cloudy.
30	124.0		S. or S. W.	Ditto.
31	123.0	0.18	S. or S. E.	Ditto.

ci Cirri, ci Cirro-strati, ci Cumuli, ci Cumulo-strati, ci Nimbi, —i Strati, ci Cirro-cumuli.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June, 1855.*

Latitude 22° 33' 1" North, Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the Level of the Sea 18.11. ^{feet}

Daily Means, &c. of the Observations, and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.544	29.616	29.478	0.138	88.2	93.7	84.2	9.5
2	.549	.592	.507	.085	88.3	94.8	82.0	12.8
3	<i>Sunday.</i>							
4	.568	.626	.508	.118	88.4	96.1	81.0	15.1
5	.555	.611	.473	.138	88.1	93.6	83.7	9.9
6	.511	.590	.439	.151	89.6	97.8	83.6	14.2
7	.454	.503	.397	.106	88.4	96.4	84.3	12.1
8	.479	.559	.423	.136	83.3	90.2	78.7	11.5
9	.561	.612	.493	.119	83.4	90.3	78.4	11.9
10	<i>Sunday.</i>							
11	.553	.616	.473	.143	88.8	95.8	84.2	11.6
12	.543	.599	.500	.099	88.4	95.9	84.0	11.9
13	.545	.609	.482	.127	88.3	96.4	83.4	13.0
14	.586	.678	.529	.149	85.0	97.2	78.8	18.4
15	.641	.687	.603	.084	81.8	87.0	77.1	9.9
16	.613	.669	.539	.130	85.5	91.5	81.1	10.4
17	<i>Sunday.</i>							
18	.639	.691	.601	.090	82.7	86.4	80.1	6.3
19	.611	.653	.545	.108	82.1	84.2	79.8	4.4
20	.606	.645	.562	.083	82.5	85.6	79.0	6.6
21	.656	.712	.610	.102	83.0	86.8	80.4	6.4
22	.668	.716	.604	.112	85.6	91.6	80.3	11.3
23	.616	.677	.533	.144	86.5	91.6	82.7	8.9
24	<i>Sunday.</i>							
25	.577	.639	.508	.131	86.8	94.7	81.6	13.1
26	.534	.596	.460	.136	87.4	93.4	82.8	10.6
27	.475	.515	.412	.103	83.2	90.0	80.0	10.0
28	.477	.519	.405	.114	84.3	91.3	80.4	10.9
29	.468	.508	.419	.089	83.2	88.8	81.0	7.8
30	.439	.479	.386	.093	83.6	87.6	80.8	6.8

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June, 1855.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Va- pour required for com- plete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	84.4	3.8	82.5	5.7	1.083	11.50	2.26	.836
2	84.3	4.0	82.3	6.0	.077	.44	.36	.829
3	<i>Sunday.</i>							
4	83.7	4.7	81.3	7.1	.043	.08	.76	.801
5	83.9	4.2	81.8	6.3	.060	.26	.46	.821
6	84.4	5.2	81.8	7.8	.060	.22	3.11	.783
7	84.1	4.3	81.9	6.5	.063	.28	2.56	.815
8	81.0	2.3	79.8	3.5	0.995	10.66	1.27	.894
9	80.1	3.3	78.4	5.0	.952	.21	.75	.854
10	<i>Sunday.</i>							
11	84.5	4.3	82.3	6.5	1.077	11.42	2.58	.816
12	83.8	4.6	81.5	6.9	.050	.15	.69	.806
13	83.9	4.4	81.7	6.6	.057	.21	.59	.812
14	81.1	3.9	79.1	5.9	0.973	10.40	.13	.830
15	79.4	2.4	78.2	3.6	.946	.17	1.23	.892
16	82.2	3.3	80.5	5.0	1.017	.87	.85	.855
17	<i>Sunday.</i>							
18	80.3	2.4	79.1	3.6	0.973	.45	.27	.892
19	80.8	1.3	80.1	2.0	1.005	.80	0.71	.938
20	80.0	2.5	78.7	3.8	0.961	.33	1.31	.887
21	80.5	2.5	79.2	3.8	.976	.48	.34	.887
22	81.3	4.3	79.1	6.5	.973	.38	2.38	.813
23	82.0	4.5	79.7	6.8	.992	.57	.53	.807
24	<i>Sunday.</i>							
25	81.2	5.6	78.4	8.4	.952	.15	3.06	.768
26	81.3	6.1	78.2	9.2	.946	.07	.38	.749
27	81.0	2.2	79.9	3.3	.998	.72	1.17	.902
28	81.1	3.2	79.5	4.8	.986	.55	.73	.859
29	80.7	2.5	79.4	3.8	.983	.54	.35	.886
30	81.1	2.5	79.8	3.8	.995	.66	.37	.886

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid-night.	29.571	29.677	29.469	0.208	83.2	86.4	78.4	8.0
1	.561	.668	.445	.223	82.9	86.0	77.9	8.1
2	.550	.656	.433	.223	82.6	85.4	77.1	8.3
3	.542	.644	.429	.215	82.5	85.1	77.6	7.5
4	.542	.645	.423	.222	82.3	85.0	77.8	7.2
5	.546	.652	.429	.223	82.2	85.1	77.9	7.2
6	.566	.676	.435	.241	82.3	85.2	77.8	7.4
7	.580	.689	.447	.242	83.2	86.0	79.0	7.0
8	.591	.698	.470	.228	84.7	88.4	80.4	8.0
9	.600	.716	.474	.242	86.4	90.6	81.1	9.5
10	.601	.712	.479	.233	88.4	92.8	82.7	10.1
11	.591	.712	.459	.253	89.4	93.8	82.3	11.5
Noon.	.577	.698	.451	.247	90.3	95.6	81.4	14.2
1	.558	.678	.428	.230	90.0	97.2	80.0	17.2
2	.540	.655	.417	.238	89.7	97.6	79.8	17.8
3	.521	.628	.399	.229	89.5	97.8	80.6	17.2
4	.506	.611	.394	.217	88.9	97.3	79.5	17.8
5	.503	.623	.392	.231	87.9	97.0	79.3	17.7
6	.511	.641	.386	.255	86.7	94.0	79.2	14.8
7	.528	.656	.402	.254	85.6	91.8	79.2	12.6
8	.546	.678	.433	.245	84.6	90.2	79.2	11.0
9	.565	.694	.452	.242	84.1	88.6	78.8	9.8
10	.576	.691	.469	.222	83.7	87.2	79.0	8.2
11	.577	.682	.469	.213	83.4	86.4	78.7	7.7

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June, 1855.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional weight of vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	°	°	°	°	Inches.	T. °F.	T. gr.	
Mid-night.	80.8	2.4	79.6	3.6	0.989	10.60	1.29	0.892
1	80.8	2.1	79.7	3.2	.992	.66	.13	.904
2	80.8	1.8	79.9	2.7	.998	.72	0.96	.918
3	80.7	1.8	79.8	2.7	.995	.69	.95	.918
4	80.6	1.7	79.7	2.6	.992	.66	.92	.921
5	80.5	1.7	79.6	2.6	.989	.63	.91	.921
6	80.6	1.7	79.7	2.6	.992	.66	.92	.921
7	81.2	2.0	80.2	3.0	1.008	.81	1.08	.909
8	81.9	2.8	80.5	4.2	.017	.89	.53	.877
9	82.8	3.6	81.0	5.4	.034	11.03	2.03	.845
10	83.6	4.8	81.2	7.2	.040	.05	.79	.798
11	83.8	5.6	81.0	8.4	.034	10.96	3.29	.769
Noon.	84.1	6.2	81.0	9.3	.034	.94	.69	.748
1	83.7	6.3	80.5	9.5	.017	.76	.74	.742
2	83.6	6.1	80.5	9.2	.017	.78	.59	.750
3	83.7	5.8	80.8	8.7	.027	.87	.42	.761
4	83.2	5.7	80.3	8.6	.011	.71	.33	.763
5	82.8	5.1	80.2	7.7	.008	.71	2.93	.785
6	82.4	4.3	80.2	6.5	.008	.73	.45	.814
7	81.7	3.9	79.7	5.9	0.992	.59	.17	.830
8	81.4	3.2	79.8	4.8	.995	.64	1.75	.859
9	81.0	3.1	79.4	4.7	.983	.51	.70	.861
10	81.0	2.7	79.6	4.1	.989	.60	.47	.878
11	81.1	2.3	79.9	3.5	.998	.69	.27	.894

Meteorological Observations.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June, 1855.*

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the Sky.
	°	Inches.		
1	124.0	..	S.	Cloudy.
2	126.5	..	S. E. or S.	Cloudy also rain at 8 P. M.
3	<i>Sunday.</i>			Sunday.
4	137.0	..	S. or E. or S. E. or S. W.	Cloudy.
5	122.7		S. E. or E.	Thin clouds over the whole sky.
6	133.0		E. or S. E. or S.	More or less cloudy till 7 P. M. cloudless afterwards.
7	128.8	..	S. E. or S. or N. E.	Cloudless till 5 A. M. more or less cloudy afterwards.
8	..	..	N. or E. or S. E.	Cloudy the whole day, with constant drizzling.
9	124.0	0.10	S. E. or E.	Cloudy.
10	<i>Sunday.</i>		[or S. E.]	Sunday.
11	131.4	..	S. (high occasionally)	Cloudy till 1 P. M. scattered afterwards.
12	130.0	..	S. E. (sharp before [sunrise] or S)	Cloudless till 5 A. M. various clouds afterwards.
13	132.0	..	S. E. or S.	Cloudy.
14	130.0	1.11	S. E. or S. or E.	Cloudless till 5 A. M., cloudy afterwards with occasional rain.
15	128.9	0.93	S. W. or S. or E.	Cloudy and constantly drizzling or raining.
16	126.0	..	S. E.	Cloudy, also drizzling at 5 P. M.
17	<i>Sunday.</i>			Sunday.
18	..		S. E.	Cloudy and constantly raining or drizzling.
19	..	1.02	S. E.	Overcast also raining at 5 and 6 A. M. and drizzling at 10 A. M.
20	..	0.13	S. E.	Cloudy, also raining at 5 A. M. and drizzling at noon.
21	..	..	S. E.	Cloudy.
22	137.0	..	S. E. or S.	Cloudless till 8 A. M., more or less cloudy afterwards.
23	122.0	..	S.	Cloudy the whole day.
24	<i>Sunday</i>			Sunday.
25	..	..	S. W. or S.	Cloudy the whole day.
26	127.0	..	S. W. or W.	Ditto.
27	..	1.61	S. E. or S.	Cloudy also constantly raining.
28	129.0	..	S. E. or E.	Cloudy also rain after sunset.
29	..	0.94	E. or N. E.	Cloudy also rain between 1 and 3 P. M.
30	N. E. or E.	Cloudy with occasional rain.

☼ Ciri, ☼ Cumuli, ☼ Strati, ☼ Cirro-cumuli, ☼ Cirro-strati, ☼ Cumuli strati, ☼ Nimbi.

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